Final Evaluation of UNDP/GEF Project 00014640

"Russia – Removing Barriers to Coal Mine Methane Recovery and Utilization"

30 November 2010



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Abbreviations and Key Terminology

APR	Annual Project Report
BB	Bleeder Boreholes
BBM	Bleeder Borehole Methane
CDM	Clean Development Mechanism (under UNFCCC)
CMM	Coal Mine Methane
CMMRUC	Coal Mine Methane Recovery and Utilization Company
EC	European Commission
ESCO	Energy Service Companies
GEF	Global Environment Facility
GHG	Greenhouse Gases
IEA	International Energy Agency
ITA	International Technical Advisor
JI	Joint Implementation under the UNFCCC CDM
LPAC	Local Project Approval Committee
M&E	Monitoring and Evaluation
MM	Million
mtCe	Metric ton of carbon equivalent
mtCO ₂ e	Metric ton of carbon dioxide equivalent
MVP	Monitoring and Verification Protocol
NPD	National Project Director
NPAF	National Pollution Abatement Facility
PDF	Project Development Facility
PIR	Project Implementation Review
PM	Project Manager
PMU	Project Management Unit
PSC	Project Steering Committee
ToR	Terms of Reference
TPR	Tripartite Review meeting
Uglemetan	Kemerovo Coal Mine Methane Center
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
US EPA	United States Environmental Protection Agency

1. Executive Summary

Background

In 1998, the methane emissions from the Russian coal mining sector were estimated to be 2.2 billion cubic meters (bcm), which is equivalent to about 30 million metric tons of carbon dioxide equivalents (MMtCO₂e). This was about 13 percent of the total national anthropogenic methane emissions and about 3 percent of the total Russian GHG emissions. The Project "Russia – Removing Barriers to Coal Mine Methane Recovery and Utilization" was tasked with just that – removing the barriers to methane mitigation projects in the coalmine sector. The Project has been instrumental in initiating coal mine methane (CMM) development within Russia, both through direct demonstration of CMM recovery and utilization (CMMRU) technology as well as providing the catalyst for other coal companies to develop their own projects.

CMM emissions may be mitigated by the implementation of methane recovery projects at underground mines. Mines can use several degasification methods to drain methane in order to supplement mine ventilation systems that were designed to ensure that methane concentrations in underground mines remain within safe concentrations. Degasification systems can include vertical wells (drilled from the surface into the coal seam months or years in advance of mining), gob wells (drilled from the surface into the coal seam just prior to mining), and in-mine boreholes (drilled from inside the mine into the coal seam or the surrounding strata prior to mining). Currently, drilling inmine boreholes is the coal industry standard at Russian coal mines.

The quality (or purity) of the CMM gas that is recovered is partially dependent on the degasification method employed, and can determine the type of gas utilization technology that can be used. Lower quality methane can also be used as an energy source in various applications. Potential applications that have been demonstrated in the U.S., U.K., Germany, Australia, and China: Electricity generation (the electricity can be used either on-site or can be sold to utilities); as a fuel for on-site boilers, preparation plants, or mine vehicles, or for nearby industrial or institutional facilities; and cutting-edge applications, such as in fuel cells. Much of the CMM recovered at Russian coal mines is of lower (<30% methane) quality, while some mines produce medium (30-80% methane) quality gas.

Prior to the initiation of this project, there had been only nominal CMM development in Russia, with no commercial projects in Kuzbass. Although the Russian coal industry peaked in 1998 by producing 425 million tons, Russia remained the world's 5th largest coal producer in 2008 with approximately 350 million tons. The Kuznetsk Coal Basin (Kuzbass) is the major underground mining Basin in Russia, and at the time of project planning, 50 underground coal mines were operating around the western periphery of the Basin. Underground coal in Kuzbass was produced by four major coal mining companies (Kuzbassugol, Prokopievskugol [now SDS-Ugol], Yuzhkuzbassugol and Yuzhny Kuzbass) plus one separate private mine, Raspadskaya. These coal mining companies in Kuzbass did not have experience in CMMRU development when this project began.

One of the main goals of the Project was the establishment and capitalisation of the "Coal Mine Methane Recovery and Utilisation Company (CMMRUC)". The experience with CMM development in countries like China and the USA provided the template of forming the CMMRUC to develop CMM projects in Russia. It was not until the project had proceeded that it became evident that the Russian CMM market was somewhat different than those in the more established CMM countries. The identified barriers to implementing and developing CMMRU projects in Russia were unique and difficult to overcome.

Project Barriers

The major barriers that the Project had to overcome were, as follows:

- Institutional and Awareness Barriers Related to the Lack of Project Experience
 - Mines and coal mining companies in Kuzbass did not have experience in CMMRU development when this project began.
 - The lack of awareness extended to the governmental bodies as there were no regulations or defined permitting requirements for CMM development.
- Barriers Related to Technical Support for CMM Recovery and Utilization
 - Neither were there any service companies in Kuzbass that could be contracted by the mining companies to design and implement coal mine methane recovery and utilization (CMMRU) projects.
- Barriers Related to Financing CMM Recovery and Utilization
 - Prices for electricity and other energy supplies in Russia are low enough that CMMRU projects would typically require some form of subsidy in order to be economically viable. In Russia the Joint Implementation (JI) Program under the Kyoto Protocol had not been put into place, so this avenue of financial support was not available.
- Barriers Related to the Lack of Measurement, Monitoring, Reporting, and Verification of GHG Emission Reductions
 - The absence of technical tools and experience in measuring, monitoring, reporting and verifying the project-related abatement of GHG emissions was also deemed a problem to overcome.
- Regulatory barriers related to the fact there was no market mechanism (joint implementation (JI market) or tax incentives to make CMM projects commercially viable
 - The absence of a functioning carbon market over the period 2002-2010 has been a major barrier in the prevention of the development of an active CMM market in Russia.

The Project encountered numerous setbacks and took three years longer than planned to achieve its stated goals due to setbacks and delays in company and governmental decisions. For example in 2005, it was stated that most of mines simply refused to consider the possibility of hosting the first CMMRU demonstration project, mainly because of uncertainty with its possible costs, benefits, organizational solutions and long-term implications. By 2007, communications with Russia's leading coal producer, SUEK, had continued to improve. At that time SUEK was receptive to the fact that the Project Team had prepared a number of detailed reports analysing various CMM extraction and utilization options. Continued communication between the Project Team and the host coal mining company proved to be essential. The outcome proved to be positive with the eventual implementation of a CMMRU demonstration project at a different host mining company, SDS-Ugol.

Although the demonstration Project operated for only a short period of time, it was the path created by the CMMRUC that has led to three additional secondary CMMRU project at coal mines in the Kuzbass, with several others now being planned. The establishment of a real Joint Implementation (JI) program in Russia in 2010 has emerged and the approval of the SUEK JI project as one of the first 15 JI projects approved in Russia should be viewed as a major success of the project. This should further benefit the cause of CMMRU projects by providing additional carbon revenues which help to make the CMM projects economically viable. Specifically, the boiler conversion projects such as the

GEF demonstration project do need additional incentives (such as carbon revenues) to be economically viable due to the availability of low-cost coal boilers. CMMRUC showed that carbon revenues (for such boiler projects) take the IRR from negative to slightly positive, although not highly profitable.

The practical result is that the CMMRUC has been involved in all CMM development in Kuzbass, raised significantly its capacities and is sustainable providing services to the domestic coal companies and international CMM project developers. The demonstration project, (and CMMRUC in particular), have been leaders in a significant market transformation by reducing institutional barriers and facilitating major CMM developments in Kuzbass. Yet, the project has not achieved – and could not in the foreseeable future achieve - the Target Indicator Level set out for the project. Since Russia has not had a JI program (until July 2010) to provide meaningful financial incentives (estimated to be 2/3 of the revenues for CMMRU projects), it is somewhat surprising to have seen progress on any CMM development beyond the demonstration project. These currently operating and planned projects demonstrate the commitment of some companies in the coal mining industry in Russia to CMMRU project implementation, and confirm the statements in other parts of this review where the UNDP project is considered to be the primary driver for establishing the proof-of-concept and is the precursor for CMM projects in Russia.

Evaluation Ratings

The evaluation team considers the overall project outcome to be rated as **Satisfactory**. The individual ratings for specific sections are shown in the following table:

Evalua	ation Parameter	Rating	Description
Project	Conceptualization &	Satisfactory	Project provided framework for
Formulation	Design		CMM development in Russia
	Stakeholder Participation	Satisfactory	There was a broad range of
			stakeholder involvement
Project	Approach	Satisfactory	Adaptive management approach
Implementation			successfully altered project
			objectives
	Monitoring & Evaluation	Satisfactory	2007 mid-term evaluation and
			project extension led to satisfactory
			results in the end
	Stakeholder Participation	Highly	Larger-than-expected co-funding by
		Satisfactory	private sector (coal companies) and
			continued commitment since 2008
Project Results	Objectives/Outcomes	Satisfactory	Emission reduction goals likely to
			be accomplished through secondary
			projects (with JI incentives)

Project Outcomes

Specific outcomes from the Project are as follows:

- Establishment and continuation of the "Coal Mine Methane Recovery and Utilisation Company (CMMRUC) after the project ends in 2010.
- Raised public awareness and training of coal mining companies and Russian mine regulators
- Successful implementation of selected UNDP/GEF demonstration project and implementation of CMMRU projects at 2 coal companies

- Making necessary recommendations for the changes needed in the existing legal and regulatory framework and implementing those changes
- > Monitoring, evaluating and disseminating the project results and lessons learned.

Findings and Lessons Learned

The Project has developed several findings and lessons learned that can hopefully be of help in other UNDP undertakings, as follows (abridged from the Lessons Learned section in the report):

1. It is possible to turn around a project that is struggling but "adaptive management" and bold action is critical.

This project had a lack of demonstrable success in the early years, some of which was due to a project design that was not adaptable enough to changing circumstances. One of the weaknesses of GEF project planning is that it is Soviet-like in preparing for the future project implementation and management: it overemphasizes adherence to procedures, a project document that is typically 2 years old by the time it is implemented, component outcomes/indicators and detailed component budgets, and long-term objectives which might be based on limited analysis or upon future market-needs that change faster than foreseen (or in this specific case, developments which were supposed to happen rapidly in Russia which did not). Accordingly, the project manager is not empowered enough to make significant changes rapidly even though he or she sees weaknesses in the original project design. This was such a situation that the project management found itself in with this project after the first few years.

The mid-term evaluation report in 2007 was the catalyst for change, but it was really described as the means by which management could get the authority to make the necessary changes in the project design which were obvious to some of the participants at an earlier stage in the process (e.g. no capitalization of CMMRUC to provide turn-key CMMRU solutions). It is outside the scope of this evaluation to recommend wholesale changes to UNDP/GEF project planning and implementation, but surely the system of "pre-planning" and initial adherence to this "master plan" contributed to the poor performance of this project shortly after its launch.

Conversely, management and the system did perform correctly when they changed some of the project objectives and developed a new "Project Logical Framework Matrix" in 2007. How bold such action really is in the UNDP/GEF context is difficult for these evaluators to really know, but it is a credit to the project decision-makers and management that they were able to push/promote these changes through and re-align the project goals, budget, and objectives to the operational realities in Russia and the coal-mining sector.

2. Sometimes persistence pays off.

Market building exercises dependent upon the timing of critical events can easily meet failure and/or delays. In the period of 2005 to 2008 there was great interest in JI projects in Russia which led to some market activity and much assessment of JI projects in Russia. Unfortunately most of the projects stopped at the planning stage when project participants stopped further investment circa 2008. The financial crisis in 2008/2009 also contributed to the cancellation of many planned JI projects. The point is that building new markets is rarely a smooth exercise and timetables can be easily made irrelevant when government policy is a major contributor to success. This project was extended 3 times for 3 years due to a lack of early success but at the same time the project stayed within its original GEF budget during the entire lifetime.

In conclusion, during the last 2-3 years the project started to meet real success with coal companies, its demonstration projects, and finally with some support from progress in the development of the

Russian JI/carbon market. So in this case it is safe to state that persistence eventually paid off for this project and its supporters.

3. Champions are required within the stakeholder institutions to engage with the project and promote its objectives internally.

In all cases, individuals who championed the cause made the difference in the organizations that participated in these projects. Therefore future projects need to identify these key allies within these stakeholders as soon as possible. This was certainly the strategy leveraged by CMMRUC and UNDP staff, and one of the reasons Mr. Tailakov was effective at promoting the project in the coal-mining companies and regional government. He was viewed as a legitimate actor despite his promotion of a novel/risky concept in Russia at the time. Mr. Tailakov put his efforts toward the people within the coal companies and government who could "champion" the cause and who were high enough in the organization to drive forward their involvement in the project. So using professional networks and engaging these is a skill that should not be underestimated for future projects.

4. Every country is unique! And Russia might be more unique than most.

Experience from other countries and regions are useful but not always applicable to the local situation. Even though CMM utilization best practices and successes from other countries were the starting point for this project, it is evident that such practices are always going to be secondary to the regulations and norms in Russia that stipulate how mines are degassed for safety reasons. Furthermore, in hindsight the CMMRU potential in Russia and consequent GHG reduction opportunities were overestimated from the beginning of this project and even during subsequent reviews when the goal of 1 million tons CO_2e annual reduction was decided. It is difficult for the evaluators to pinpoint a specific reason for this with any certainty. Some culprits might be the lack of public availability of high quality data on methane emissions (and the type) in Russian coalmines; and possibly an analysis which leaned too heavily on analogies from other countries and which perhaps needed more rigor (and/or funding) to produce an accurate picture of the potential from a technological and business perspective.

Undoubtedly Russian governmental bureaucracy hindered, and still hinders, the development of the CMMRUC market. From failures to implement JI in a timely manner to regulations that primarily focus on degasification (i.e. mine safety not methane utilization), the impact of multi-level bureaucracy was underestimated by the project designers.

Therefore, a lesson learned may be that market building exercises/interventions need to better consider the risks and odds of changing behavior in conservative, highly regulated industries. On the other hand, if nothing is ventured nothing is gained or learned. GEF funding is supposed to be used for (risky) innovations, and CMMRU projects in Russia were certainly novel and innovative. History is littered with great innovations that failed to be adopted, so to be active in the "innovation business" means one must expect less than a 100% success rate to begin with. So, while this project was not an unmitigated success on all fronts, neither was it a failure.

5. Having UNDP staff with knowledge of the industry is critical

The evaluators suspect that UNDP and GEF, being environmentally focused organizations, had few, if any, staff onboard that really understood the Russian coal industry and what would really drive decision-making in that industry. So it took some time before realistic goals for the project, and a message to the industry could be formulated that really resonated; and at the end of the day, external events such as mine accidents, or the need to show progress on the environment to the government, might have been just as critical in getting the coal mining company management(s) to finally take the project's message seriously. Therefore, one lesson may be to recruit project personnel with industry experience into the implementing agency when executing industrial focused projects, if possible, so that the different institutional cultures (and professional languages) can be quickly bridged. In addition, finding the right international advisor/expert for the project is a challenge but it is necessary to bring a good one onboard that can bring industrial best practices from other regions of the world to the project.

Recommendations

The Recommendations within the Report are as follows, with no further corrective actions recommended for any of the individual elements:

• Corrective actions for the design, implementation, monitoring and evaluation of the project

The project management has corrected the early implementation and monitoring problems.

• <u>Actions to follow up or reinforce initial benefits from the project through the dissemination of information</u>

The sustainability of the CMMRUC is key to any actions the evaluators can suggest as follow-up action since their sheer existence will be a continuing reminder to coal mining companies and even international carbon funding sources that CMMRU development in Russia can be a viable undertaking, especially if the JI Program is continued.

<u>Proposals for future directions underlining main objectives</u>

The CMMRUC needs to maintain their marketing effort and continue to promote the development of CMMRU projects in Russia. Fortunately, SUEK, the largest coal mining company in Kuzbass has a more consistent approach to CMMRU projects since they have defined specific staff members who have the responsibility for operating and developing additional CMMRU projects. It is hopeful that the Russian JI Program is continued so that it would provide SUEK, and other coal mining companies, the incentive to implement more such projects.

Evaluators

The evaluation report was produced by a two-person team, consisting of a CMM Specialist (Michael M. Cote) and Auditing Specialist (Jesse Uzzell) with experience in the carbon market and JI in Eastern Europe and Russia. The two Specialists cooperated with each other in performing the work specified in the ToR. Each of the Specialists was assigned various sections of the Evaluation for which they were to provide written results of their evaluation. The purpose of the current evaluation is to determine if the project accomplished its main goals and objective. This was accomplished in this evaluation by assessing the project design, its implementation, attainment of defined objective, outcomes and outputs (original or modified) and other notable achievements.

2. Introduction

The UNDP/GEF Project 00014640 "Russia – Removing Barriers to Coal Mine Methane Recovery and Utilization" has been underway since 2003. It concludes on 31 December 2010. The purpose of the current evaluation is to determine if the project accomplished its main goals and objective. This was accomplished in this evaluation by assessing the project design, its implementation, attainment of defined objective, outcomes and outputs (original or modified) and other notable achievements.

This allows one to achieve the purposes stated in the "Guidelines for GEF Agencies in Conducting Terminal Evaluations", where this Terminal Evaluation is meant

"a. To promote accountability and transparency, and to assess and disclose levels of project accomplishment

b. To synthesize lessons that may help improve the selection, design, and implementation of future GEF activities

c. To provide feedback on issues that are recurrent across the portfolio and need attention, and on improvements regarding previously identified issues d. To contribute to the GEF Evaluation Office databases for aggregation, analysis, and reporting on the effectiveness of GEF operations in achieving global environmental benefits and on the quality of M&E across the GEF system."

The key issue raised during this particular evaluation was the determination of past and current attitudes and accomplishments related to CMMRU projects from major stakeholders in the project, including coal mining companies and the Regional and National Governments. There were also a variety of secondary issues related to the management of the UNDP/GEF project.

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The Specialists began the evaluation with a literature review of a variety of existing documents, reports, presentations, and previous evaluations related to the project, including annual project implementation reviews (PIR's), the mid-term evaluation report and reports prepared by the International CMM Expert. Following the desktop review and the orientation discussions with the UNDP Country Office and with the UNDP/GEF Regional Technical Advisor, the Specialists travelled to Moscow and Kemerovo in July 2010 for interviews with representatives of major project stakeholders. These interviews included two of the major coal mining companies in Kuzbass, SUEK and SDS-Ugol, as well as the Regional Government of Kemerovo Region, and the Federal Ministry for Economic Development, and UNDP. The coal mining company meetings included both management individuals in Moscow as well as management and field staff at coal mines in Kuzbass. The individuals with whom the Specialists met are listed in Annex 3. Following, the interviews the Specialists requested supplemental information from the UNDP Country Office and prepared this report.

3. The Project and its Development Context

Methane (CH₄) is one of the six major greenhouse gases (GHGs) representing approximately 10% of global GHG emissions. It occurs naturally and also has significant anthropogenic sources, which are likely greater than the natural sources. Methane has unique characteristics relative to other greenhouse gases. Its global warming potential is 23 times more potent than carbon dioxide (CO₂) even though it has a relatively short life span in the atmosphere. Unlike CO₂, it can be used as a clean energy source, thus its capture and use, in lieu of emissions, can provide positive environmental

benefits. In 2005, methane emission from coal mining activities represented approximately 6% of all anthropogenic methane emissions worldwide.

Because the project was developed over a decade ago, it is useful to review data and the perspective available at the time that the project was being planned. In 1998, the methane emissions from the Russian coal mining sector were estimated to be 2.2 billion cubic meters (bcm), which is equivalent to about 30 million metric tons of carbon dioxide equivalents (MMtCO₂e). This was about 13 percent of the total national anthropogenic methane emissions and about 3 percent of the total Russian GHG emissions. Close to 90 percent of the coal mine methane (CMM) emissions were produced in two regions: the Pechora Region and Western Siberia. No comprehensive CMM emissions inventory has been developed, however the 2008 coal production from Russian mines was approximately 350 million tons (or about 82% of the industry's peak in 1998). Extrapolating from this, the current methane emissions from the Russian coal mining sector is estimated to be approximately 1.8 bcm.

The methane emissions from coal mining include underground mining, surface mining, and underground post-mining. In 1998, 53 percent of the CMM was from underground mining. This level of CMM emissions was considerably lower (~ 55%), as compared to what had been experienced in 1990. This drop in emissions resulted from the contraction of the coal mining industry after the dissolution of the Soviet Union. Only 1-2 % of the 1998 emissions were being utilized, primarily at the underground mines located in the Pechora Basin. The rest was vented into the atmosphere. Estimated future methane emissions from underground mines, based on constant average emission factors and mid-range coal output forecast, were expected to be 1.8 bcm in 2010 and 2.4 bcm in 2020. If 50% of the underground mine CMM emissions at that time could have been captured and utilized, the annual reduction would have been 0.6 bcm of methane, or 8 MMtCO₂e.

The Kuznetsk Coal Basin (Kuzbass) is located in the southern part of West Siberia and its territory is almost entirely encompassed within the Kemerovo Region, a major industrial center of Russia. The Kuzbass is a highly folded inter-mountain depression, which contains Permian and Carboniferous aged coals. At the time of project planning, 50 underground coal mines were operating around the western periphery of the Basin. They primarily exploited methane-containing coals ranging from High Volatile C Bituminous to Low Volatile Bituminous in rank. Underground coal in Kuzbass was produced by four major coal mining companies (Kuzbassugol, Prokopievskugol [now subsidiary of SDS-Ugol], Yuzhkuzbassugol and Yuzhny Kuzbass) plus one separate private mine, Raspadskaya.

Underground coal production in Kuzbass had grown significantly over the three years preceding 1998. By 1998, underground mines in Kuzbass were producing about 44 million tons of coal and that increased to 50 million tons in 1999. Underground mining in Kuzbass was liberating nearly 0.7 bcm of methane annually. None of this methane was being utilized.

The Russian Federal and regional governments were starting to recognize that CMM was a valuable energy resource. Measures to use coal methane as a fuel for boilers were listed in the environmental policy section of Russia's Energy Strategy. The respective governments wanted to have economic development occur in Kuzbass and CMM recovery and utilization projects were expected to help in such development.

Economics of Coal Mine Methane Projects in Russian Federation

As a demonstration project, economics was not the driving factor for the success for the GEF/UNDP boiler project. Outside of carbon credits and tax incentives, revenues for CMMRU projects are a function of energy prices for electric and thermal power and natural gas. Unfortunately, Russia energy prices are relatively low when compared to other coal mining countries. Because of the low energy prices, Russian projects require an even higher level of carbon credit prices to offset the difference. Figure 1 shows a chart from the 2006 CMM Workshop in Kemerovo that demonstrate the carbon credit prices needed to achieve a 20-30% IRR (ranges needed to attract financing of projects). The chart shows Russia to be on the high end of the scale as compared to most other coal mining

countries. Only a few countries are shown, but only South Africa and Kazakhstan have lower energy prices than Russia.

Presentations made by Severstal Group in 2007 for proposed CMMRU projects in the Vorkuta region showed similar economic forecasts – CMMRU projects achieving a 5-year payback with carbon credits. Without carbon credits, the projects may only achieve a 0-5% IRR, making them financially unattractive without the JI program.



It was very advantageous that this Project, "Russia – Removing Barriers to Coal Mine Methane Recovery and Utilization", was started at such an appropriate time. It was initiated on 27 August 2003 and was intended to last for four years, ending in October of 2007. It has been granted three annual extensions and will now be terminated on 31 December 2010. The extensions were granted as a reaction to delays in the project implementation due to the reasons described below in Section 4.2 Project Implementation. It is important to note that this project was considered a "first of its kind" commercial development that had not previously been attempted in Kuzbass.

In addition to the commercial barriers, there were numerous legal and regulatory problems that had to be overcome in trying to develop CMM projects in Kuzbass. These were well defined during the initial project planning phase and included the following (as described further in the Full Size Project Document [FSPD] and more recently in the 2010 Barrier Analysis Report):

Institutional and Awareness Barriers Related to the Lack of Project Experience

Mines and coal mining companies in Kuzbass did not have experience in CMMRU development when this project began. The experience with CMM in other coal basins (e.g., in the Komi Republic, Kazakhstan, etc.) had not been transferred to Kuzbass due to the absence of successful pilot/demonstration projects implemented by Kuzbass mines.

Since the Kuzbass coal mine managements did not understand the benefits of CMM utilisation, a considerable amount of effort had to go into raising their awareness of CMM development and its benefits. The coal companies showed interest in the efforts and letters of interest in providing co-funding were even received. However, when it came time for siting the first demonstration project, the interest by the coal companies waned as they had difficulty in defining the potential risks from such an installation. This issue is described further in the Results Section, below.

The lack of awareness extended to the governmental bodies as there were no regulations or defined permitting requirements for CMM development. The CMMRUC had to start with a "blank page" with regard to any permits that might be needed for such an installation.

Barriers Related to Technical Support for CMM Recovery and Utilization

Along with the lack of awareness regarding CMM by the coal mining companies noted above, they obviously did not have any staff with knowledge about CMM utilization. Neither were there any service companies in Kuzbass that could be contracted by the mining companies to design and implement coal mine methane recovery and utilization (CMMRU) projects. There were local experts and engineers with knowledge about coal-related processes but they lacked practical expertise in CMMRU projects. This lack of experience extended from technical to financial and managerial aspects.

Barriers Related to Financing CMM Recovery and Utilization

Economic benefits had to be defined before any financing could be found for CMMRU projects. Unfortunately, the prices for electricity and other energy supplies in Russia are low enough that CMMRU projects would typically require some form of subsidy in order to be economically viable. In most other countries, such subsidies were available in the form of carbon credit sales. In Russia the Joint Implementation (JI) Program under the Kyoto Protocol had not been put into place, so this avenue of financial support was not available.

Given the national scale of the JI Program, it was outside the scope of this project to try and influence that Program. But, tasks were laid out for the CMMRUC to work with the Kemerovo Regional Administration regarding the possibility of providing local tax incentives for CMM development.

The only national financial impact on CMM at the beginning of the project was the fine that was assessed for all methane emissions, including those from coal mines. However, that was so trivial that even as the fine was increased by a factor of 1000 during the second year of the project (2005), it was still not large enough to provide a financial incentive to capture the methane rather than to release it to the atmosphere. In accordance with the Government of the Russian Federation Decree $N_{\rm P}$ 410 (2005), payments for methane emissions were raised from RUB 0.05 to 50 per tonne of methane emissions (US\$0.017 to about US\$1.67 per tonne of emissions). There was also a maximum emission limit set for each mine and for those methane emissions that exceeded the respective maxima, then the fine rose from RUB 0.25 to 250 per tonne of methane emissions (US\$0.08 to about US\$8 per tonne of emissions). Even the larger amount charged for the excess methane over the limits still has a very small financial impact as compared to something like the JI program. The US\$8 per tonne of methane is equal to about US\$0.40 per tCO₂e, as compared to JI credits that are worth over US\$12 per tCO₂e.

Barriers Related to the Lack of Measurement, Monitoring, Reporting, and Verification of GHG Emission Reductions

The absence of technical tools and experience in measuring, monitoring, reporting and verifying the project-related abatement of GHG emissions was also deemed a problem to overcome.

Overcoming these problems was necessary in order for the project to achieve the overall Project Objective of "Reducing the amount of methane vented into the atmosphere from coal mines". In addition to the overall Project Objective, there also were a number of Outcomes (expected results) laid out for the project during the planning phase, as follows:

Barriers related to lack of a functioning JI market in the Russian Federation

The Russian Government gave initial signals to the market that it would an operational JI approval system in place by 2008 or earlier. Due to delays and changes in the regulations a project approval system was delayed until 2010. Currently, no JI projects have received actual revenue from the transfer and sale of ERUs outside of Russia. So while there is significant progress projects have still to receive financial payback on the investment due to JI. This is, of course, hindering investments in JI projects and CMM projects.

Establishment and Capitalisation of the "Coal Mine Methane Recovery and Utilisation Company (CMMRUC)"

The business strategy of the Company was to provide "full service" to coal mining companies without the need for the client to make an investment in such development. The Company was to propose improvements to the coal mine's gas drainage system and to facilitate the use of the CMM.

Public awareness raising and training

At the beginning of the project there was a lack of awareness and local experience relative to coal mine methane recovery and utilization technologies and their benefits to the mines' operations as well as to the environment. It was recognized that a significant effort was needed to raise the awareness of the mines' managements, to train their staff and to build the capacity of the CMMRUC staff to promote the development of CMM projects.

Implementation of selected demonstration projects

It was envisioned that the CMMRUC would carry out at least one CMM recovery and utilization (CMMRU) project. From the technical standpoint, the demonstration projects were expected to i) introduce more effective drilling techniques for degasification of the mines and to ii) capture and use the gas as an energy supply.

Reviewing and, as applicable, making recommendations for the changes needed in the existing legal and regulatory framework.

There was a need to conduct a detailed review of existing legal and regulatory frameworks and to prepare a set of recommendations for the eventual changes that would help in the development of CMM projects. The issues to be covered would include technical safety standards and degasification requirements, plus gas ownership issues. There would also be an effort expended for promoting possible tax and other incentives.

Monitoring, evaluating and disseminating the project results and lessons learned

Throughout the project, efforts were to be made to facilitate the effective monitoring and reporting of the experiences and results of the project. This would provide the bases for describing lessons learnt and further replication of CMM development elsewhere. The dissemination of information would be performed through the mass media and the CMM industry communication options.

Having established a sound basis for the project with the aforementioned objective and outcomes it was anticipated that it would achieve significant results in promoting CMM development in Russia. It was expected that a reduction in methane emissions would accompany such development. The means for accomplishing this was to

• form the CMMRUC,

- build the capacity of the CMMRUC staff by supplementing its existing CMM experience with additional key training,
- raise the awareness of CMM development potential among the coal mine managements,
- implement appropriate demonstration(s) of CMM capture and utilization,
- review existing legal and regulatory barriers to CMM development and provide a roadmap for overcoming these barriers, both for CMMRUC and other potential CMM developers,
- promote the passage of tax credits and other incentives for CMM development on national and regional levels,
- monitor the effectiveness of the project by measuring the methane capture and use that is developed by the project, both directly and indirectly, and
- disseminate the results of the project via mass media means as well as CMM industry channels.

4. Findings and Conclusions

4.1. Project Formulation

Conceptualization/Design.

The original Project Concept/Design was well thought out (albeit ambitious) and addressed the potential for implementation of CMM development on several fronts: institutional, regulatory, business/financial and environmental (carbon emissions). The institutional elements covered awareness and technical readiness. The lack of identifiable permits for CMM development led to the task of developing the skills to cope with loosely-defined regulatory issues. Business and financial considerations were addressed. And, possibly the most important element was actual reduction in methane (carbon) emissions.

There was an initial Logframe Matrix established at the beginning of the project planning which had started in 2002. However, it became evident during the project implementation that the Logframe was outdated in form and substance. In order to correct this, a revised Logframe was prepared in 2007. It incorporated the following changes:

- Current GEF terminology was used to update terms such as Development Goal and Project Purpose;
- Some of the Indicators were refined in order to reflect direct project impacts and not just overall changes occurring in the region;
- Achievement of Target Levels for most of the original Indicators would have had to wait for the end of the project, so some Indicators were divided so that project progress could be monitored on an annual basis;

Some of the Indicators were modified to make them more quantifiable; and

Output Indicators, as defined in the original project Matrix, were combined to form Outcome Indicators so they would be more in line with current GEF requirements.

More detailed comments about the Project Design are presented below. These are patterned after the original Logframe Matrix presented in the Full Size Project Document but with the most recent terminology applied to the Logframe elements. The respective Indicators from the second LogFrame Matrix (2007) are also listed.

<u>Outcome 1:</u> Establishment and capitalisation of the Coal Mine Methane Recovery and Utilisation Company (CMMRUC) and ensuring its sustainable operation

The experience with CMM development in countries like China and the USA provided the template for forming the CMMRUC to develop CMM projects in Russia. The conceptual design for the CMMRUC circa 2003 called for the creation of a center that could provide a "turn-key" solution for Russian coal-mines, including financing and operation of the equipment (Figure 2).



Figure 1: The original concept for CMMRUC from the 2003 Project Document

As quoted from the original Prodoc the idea was to capitalize the company (CMMRUC) to allow it to leverage additional project co-finance resources in order to provide a full-service/turn-key project to the mines:

The initial capitalization needs of the company have been estimated at about USD 3 million, of which approximately USD 2.5 million would be reserved for the actual investments and some USD 0.5 million for covering the start-up costs of the company. After 1-3 years, the company is expected to operate on a full cost recovery basis with the estimated 15-20 % minimum return on investment. Any profits from the company for the state owned shares (by using the GEF grant as equity) will be fully used for the further promotion of coal mine methane recovery and utilization activities in Kuzbass and in other coal mining areas in Russia.

In retrospect the CMMRUC financial projections/goals were absolutely too optimistic and relied on the establishment of a project finance/ESCO model. It was not until the project had started that it became evident that the Russian CMM market was somewhat different than those in the more established CMM countries. The concept of creating a separate (and start-up) development company (CMMRUC) to implement CMM projects at operating coal mine sites proved not-to-be viable in Russia – at least not by approaching large coal companies with a new CMMRUC that did not have prior experience at operating CMM projects. A company like CMMRUC would need project development and operating experience, possibly at a smaller coal mine, before being seriously considered by the larger coal companies. In addition the support for soft-loans of up to USD 1.5 million from the National Pollution Abatement Facility (NPAF) were later retracted and not provided for the project, which was another blow to the original business plan.

The actual development of commercial CMM projects was expected under the Project Plan, but there were difficulties in implementing such projects. Without a JI Program in place, the profitability of CMM projects is marginal at best. This is mostly due to the fact that natural gas prices are below international levels in Russia and electricity prices are below average as well. That means that the coal mining company might have to provide some form of subsidy that would support the CMM utilization project. The CMMRUC might have achieved success sooner had there been a JI Program in Russia. Given the low economic return from CMM projects, it would have been difficult for CMMRUC to be a profitable company strictly as a CMM project developer. It appears that having CMMRUC become more of a "service company" has been more effective and ultimately led to success.

At the time of the project planning, the expectations of a functioning CMMRUC comparable to those in other CMM countries, plus the assumption of available subsidies from a JI Program to support projects (that was "imminent") were reasonable and prudent at the time. However, as the aforementioned limitations became evident during the course of the project, it became apparent that the development/business plan for the CMMRUC needed to be re-directed in 2001.

The original Logframe Matrix identified the following Indicators to measure the progress under this Outcome:

- Indicator 1.0: The company established and capitalized at the amount of at least USD 3 million.
- Indicator 1.1: The company has been formally registered in a set-up envisioned in the project document.
- Indicator 1.2: The company operates in a financially sound manner and has managed to leverage additional financial resources for continuing and expanding its operations by the end of the 3rd year of its operations

According to the most recent (2007) Logframe Matrix, the progress towards achieving Outcome 1 was to be measured against the following Indicators:

2. Stakeholders identified and agreed on the legal & organizational arrangements for CMMRUC establishment providing the most efficient way for further capitalization of the company and its sustainable development

3. The company is formally registered and staffed according to the agreed institutional setup.

4. Business plan for CMMRUC developed and accepted by stakeholders

5. The company operates in a financially sound manner and has managed to leverage additional financial resources for continuing and expanding its operations by the end of the project

The changes in the Indicators were prudent. The Stakeholders needed to be involved in the decisions relating to the CMMRUC formation and its structure. Since the CMMRUC was unlikely to have the same mandate as originally conceived, there was no need to keep the indicator that specified the amount of capitalization (\$3 millions) for the Company.¹ The development of a Business Plan was essential given the objective of forming a new company in new markets. A Business Plan provides

¹ In the view of the UNDP RTA in Bratislava it was a mistake not to make major efforts to properly capitalize the company in a manner which would have allowed it to focus on investment activities and not only consulting. However, the evaluators did not see evidence of competitors to CMMRUC successfully offering "turn-key" CMMRU solutions in Russia, and it is not possible for them to state whether the original plan would have been commercially successful in Russia even if the company had been capitalized.

the Company with a guide for its marketing and development and allows it to project and model cashflows. It was also appropriate to change the time frame for the Company to become sustainable and expand its operations to the end of the project since it was evident that the project would need to last more than three years.

<u>Outcome 2:</u> Promoting the demand for methane recovery and utilisation projects and building the capacity of the local personnel of the CMMRUC and the participating mines to develop, market, finance, manage and implement the projects.

Building on the lesson learned from the GEF India project, as noted below, the project work plan benefited from experiences in other CBM/CMM projects. Given the lack of a trained work force that was experienced with CMM project design and operation, the CMM industry in Russia would not be able to develop and grow. The inclusion of this element in the work plan was very important.

The original Logframe Matrix identified the following Indicators to measure the progress under this Outcome:

- Indicator 2.0: Number of request received from the mines for developing the methane recovery and utilization. Reducing need for international expert support for the development and implementation of CMM projects.
- Indicator 2.1: Level of awareness of the key stakeholders on the modern approaches and technologies for methane recovery and utilisation
- Indicator 2.2: Enhanced capacity of the local personnel to successfully run the business of the CMMRUC and to implement CMMRU projects on their own (reducing need for international expert support).

According to the 2007 Logframe Matrix, the progress towards achieving Outcome 2 was to be measured against the following Indicators:

6. At least six inquiries received from mines regarding methane recovery and use.

7. Mines initiate changes to their existing drainage resulting in better mining safety conditions, increased productivity of their degasification systems and growing interest to methane utilization. Mines initiate methane utilization without changing drainage practices.

8. Focused training courses for CMMRUC personnel organized in order to enhance capacity of CMMRUC staff to successfully run the business and to develop, market, finance, manage and implement CMMRU projects on their own (reducing need for international expert support).

The evolution between the two Logframes appears logical and reasonable. The more recent Indicators are more specific (e.g. calling for at least a certain number of inquiries per year and "focused training" for capacity building) and make the progress towards achieving Outcome 2 easier to quantify.

<u>Outcome 3:</u> To demonstrate the feasibility of and gain experience for the implementation of CMMRUC projects.

This element of the project was absolutely necessary and a valuable component in the project plan. There was an initial lack of exemplary CMM developments in Kuzbass. It was necessary to show coal mine managements that CMM utilization projects could be successfully planned, designed, permitted, installed and operated. Without this kind of practical "hands-on" example, it would have been almost impossible to catalyse action on the part of the coal mining companies to initiate CMM development.

The original Logframe Matrix identified the following Indicators to measure the progress under this Outcome:

Indicator 3.0: Successfully finalized demonstration projects demonstrating the feasibility of coal mine methane recovery and utilization.

Indicator 3.1: Contracts signed [between the CMMRUC and participating mines].

Indicator 3.2: The needed equipment have been procured, installed and commissioned. Projects starting to produce net revenues for both the mines and the CMMRUC

According to the 2007 Logframe Matrix, the progress towards achieving Outcome 3 was to be measured against the following Indicators:

9. Demo project design completed

10. Equipment purchased and installed, project(s) launched on the ground.

11. Demo project monitoring proved technical and economic feasibility of coal mine methane emission reductions combined with heat production.

12. The most feasible option(s) for the CMMRU demonstration selected

The most recent indicators according to the 2007 Logframe provided verifiable measurement of the progress in demonstration project design and implementation at different stages of development.

<u>Outcome 4.</u> Strengthening the legal and regulatory framework for making it more supportive for methane recovery and utilization.

When this project was in the planning stages, there were no regulations available to guide the design and construction of a CMM utilization project. It was important that the CMMRUC confirm this conclusion and prepare a road map to guide themselves, as well as other stakeholders, through the maze of mining and industrial regulations that might apply to such installations. There was appropriate foresight by the project planning team to have included this task in the project work plan.

The original Logframe Matrix identified the following Indicators to measure the progress under this Outcome:

Indicator 4.0: Revisions in the legal and regulatory framework supporting the coal mine methane recovery and utilization adopted.

Indicator 4.1: Report finalized and available

Indicator 4.2: Recommendations finalized and submitted for formal Government approval process.

According to the 2007 Logframe Matrix, the progress towards achieving Outcome 4 was to be measured against the following Indicators:

13. A review of effectiveness of existing legal and regulatory framework in supporting

CMMRU projects performed, gaps identified.

14. Recommendations for improvement of existing legal and regulatory framework submitted for formal approval by the Government.

Although the original Indicators had a little bit more detail, the subsequent simplification in the second Logframe Indicators did not lose the essence of the work required. These activities demonstrate how comprehensively the project plan was formulated.

Outcome 5: Documenting and disseminating the results, experiences and lessons learned

After successful development of a CMM project, or series of projects, one should distribute information regarding the benefits from these efforts. Since the regional and national capabilities for accomplishing such projects were limited before the start of this project, it was valuable to allow for such information dispersal.

The original Logframe Matrix identified the following Indicators to measure the progress under this Outcome:

Indicator 5.0: Final project report documenting the results, experiences and lessons learned

Indicator 5.1: A system to monitor and verify the GHG reductions in place

Indicator 5.2: Reports finalized and available

Indicator 5.3: Results disseminated and seminars and workshops organized

According to the 2007 Logframe Matrix, the progress towards achieving Outcome 5 was to be measured against the following indicators:

15. Results of demo project implementation and project lessons learned documented.

16. GHG emissions reduction in pilot demo project monitored. Project technical reports are made publicly available.

17. Workshops aimed at raising awareness organized. Other result reporting activities through newspapers, magazines; newsletters to coal companies; direct electronic news and information dissemination to journalists and press-services of coal companies and administration of Kemerovo region, radio and TV.

As with the other Outcomes the original list of activities is quite comprehensive. The 2007 LogFrame Indicators added more emphasis to ongoing reporting of project results other than the demonstration projects. It was also valuable to have added specific comments about dissemination of project information through mass media channels.

Another valuable element of the original Project Plan was stated in the full sized project document "FSPD" but did not have specific Objective associated with it, nor an Indicator. But, it is noted here since it showed the sensitivity the project planners had to the institutional barriers to CMM development in Russia that existed at the beginning of the project. The FSPD indicated the importance of "raising the awareness of the management of the mining companies on the advantages of and possibilities for improved mine degasification and methane utilisation".

Given the limited CMM development that had occurred in Russia at the time that this Project was initiated, this planned task was a necessary step to plant the seed for managements to consider the benefits from CMM development. As in other countries, the primary focus of coal mine company

managements is to produce coal. They are reluctant to undertake side ventures that distract them from that primary task unless they are convinced that the new undertaking is of some value to their business. The work under this task would enable the CMMRUC to promote both mine safety, through the improved drainage concept, and financial benefits, through the implementation of economically viable CMM utilization projects.

All of the individual elements of the project plan, as described above, were melded together to formulate a strong project work plan. And these were supplemented with the attention to the aforementioned institutional issues. On an aggregate basis the project plan identified all the necessary tools that would be required to implement successful CMM development in Russia and provide dissemination of results so others could replicate this work.

One aspect of the project plan that might be considered weak - the original Development Goal: "To create a viable market for and initiate otherwise the implementation of commercially feasible coal mine methane recovery and utilization projects in Russia". The original Indicator and associated Target Level were: "The investments into combined coal mine methane recovery and utilization projects exceed USD 5 million per year (including those generated from JI mechanisms)". It was judged that investments were not an appropriate quantitative measure of the progress of the project. The money expenditures are not a direct measure of environmental benefits from the project. Many factors can influence investments and this project is not one of the major factors. Issues such as coal company approaches and commitment plus governmental attitudes can affect investment decisions beyond any influence of this project.

As a result, this Development Goal evolved into the Project Objective in the second Logframe, which was stated as "Reducing the amount of methane vented into the atmosphere from coal mines". The Indicator and Target Level associated with this Project Objective was: "The annual GHG emissions from venting coal mine methane into the atmosphere coming a) directly and b) indirectly from project activities amount to 1 MMtCO₂e with an increasing trend." This Indicator provided a much better quantification of environmental benefits, although the Target quantity was, in retrospect, overreaching and dependent upon a viable (JI) carbon market in Russia.

This new Target Level was developed in 2007 following the mid-term evaluation along with new or modified targets. Annex 2 lists the old targets and new targets that the project management decided for 2007 and onwards. The most substantial changes related to the goals for CMMRUC business development, new goals for the demo projects, and the aforementioned target for CO_2 abatement. This new CO_2 abatement target represented an attempt to have a realistic figure against which one could judge the possible impact of the project over its lifetime. The Target Level was based on the estimated potential for direct (from the project-funded MBS demonstration) and indirect (from SUEK investments at their coal mines that had been stimulated by the project) emission reductions. At the time, the SUEK projects were the only known planned CMM developments.

This Target had been based on the PDD prepared (as prepared at the request of SUEK by the CMMRUC) for the proposed CMM development at six of SUEK's coal mines in Kuzbass. It had been estimated that these six mines would be capable of reducing methane emissions by over 5 MMtCO₂e in a five year period. That was converted to an annual basis to yield the 1 MMtCO₂e Indicator target level.

SUEK has never developed CMM projects at all of the mines described in the PDD, having installed CMM-fired generators at only the Kirova Mine. Although the installation of those generators was catalysed by the project activities, including direct participation by CMMRUC in the PDD preparation and assistance with actual field installations and operation, future installations at other SUEK mines will have to await that Company's decision making. Current plans are to move ahead with more CMM projects, but the uncertainty surrounding how to actually monetize any emission reductions (due to a lack of clarity and/or complicated rules from Sberbank, the manager of Russia's JI program) cause SUEK management to proceed with caution.

This is the primary reason why Target Level ended up being unachievable. At the time the estimate was made, it was realistic to think that SUEK would pursue the developments proposed in the PDD.

One additional comment should be added about the original project planning work. It was valuable to have had both the UNDP and the project design team study project documentation and evaluation from the GEF coal bed methane projects for China and India. They also briefly reviewed the former World Bank proposal for Ukraine. These reviews focused on the lessons learned from the other projects so that the current project design could avoid mistakes in those other projects. The Item iv, above, which addresses the need for mine personnel training was identified as a limitation from the GEF India project.

As a result of these considerations, one would rate the Project Conceptualization/Design as **Satisfactory**.

It was a strong plan whose implementation was hindered by developments beyond the control of the project, and it was only limited by the potential impact that it could make on the reduction of methane (greenhouse gas) emissions. But, it has still led to demonstrable progress in providing the framework for CMM development in Russia and more importantly, the Project has laid a strong foundation for future CMM development in Russia.

Country-ownership/Driveness.

At the project start-up stage it was clear that the Russian Government supported the project goals as evidenced by letters of support and co-financing commitments. A coal industry restructuring that took place during early 2000's and the expected increase in coal demand made the economic development of the coal-mining regions, including the Kuzbass coal basin a priority for the Russian federal and regional governments. CMM recovery and utilization projects were expected to promote local economic development by increasing employment and enabling increased efficiency and safety of mining operations. More efficient coal production and savings from methane were also seen as a way to improve the profitability of coal mining.

Russia is a signatory to the UN Framework Convention on Climate Change. At the time of project design and start-up Russia was expected to ratify the Kyoto Protocol, which eventually happened on November 5, 2004. Russia had several "false-starts" regarding the Joint Implementation mechanism but there were certainly signals from the government at the time of project implementation that JI in Russia would start on-time in 2008. In actual fact the first JI projects in Russia were only approved in September, 2010. Therefore the project design and objectives were fully aligned with the national and regional environmental and economic priorities that existed at the time.

Stakeholder participation.

In order to provide the best assurance that the project would be successful, the key stakeholders were identified early. These included the managements of the mines, national and international financing organizations and both national and regional governmental authorities such as the Ministry of Economic Development and Trade, the Ministry of Energy, the Ministry of Natural Resources, and the Regional Administration of the Kemerovo Oblast. These stakeholders were informed of the project progress and some were consulted regarding recommendations for future action.

A Project Steering Committee was formed at the beginning of the project and met annually throughout the life of the project. Its composition has changed several times based on governmental changes and the level of stakeholder involvement in the project. The Steering Committee now includes the representatives of the following:

- Ministry of Economic Development of the Russian Federation
- UNDP Russia

- Kemerovo Regional Administration
- Coal Mining Companies (including SUEK and SDS-Ugol)
- Institute of Coal and Coal Chemistry Siberian Branch of Russian Academy of Science

Coal mining companies were involved early in the project. They were contacted for general involvement in the project and to potentially provide a site for the initial CMM utilization demonstration. Ten mines were contacted and several even provided letters promising co-funding for the project. Their ongoing participation is described later in this report.

Several international and national financing and CMM development organizations have shown considerable interest in working on CMM in concert with the CMMRUC and this project. Most of that involvement came during the implementation phase.

Various Ministries of the Russian Federation have been involved in this project. During the initial planning stage, the primary involvement came from the Ministry of Economic Development and that participation has continued into the actual project execution. Mr. Oleg Pluzhnikov, of that Agency, has been a member of the Project Steering Committee since the project initiation. In that role he has provided a valuable liaison between the commercial interests of the coal companies and the national government's interests in policy and oversight.

The Kemerovo Regional Administration has been very supportive of the project from the beginning and helped support CMM development in Kuzbass in many ways. Their goals are to help the mining industry contribute to the regional economy and do so in a safe manner. Not only did they participate in the Steering Committee but have been a strong ally of the project until the current day.

Given the broad range of stakeholder involvement and their contributions to the planning of the project, the Stakeholder Participation in the Project Formulation phase is rated as **Satisfactory**.

Replication approach.

The primary vehicles for the replication of the project goals were the establishment of CMMRUC/Uglemetan² and the CMM demonstration projects. As part of Uglemetan and UNDP efforts during the project many marketing activities were aimed at the coal-mine companies and information/training workshops were done regularly during the project lifetime. As the number of potential coal-mine companies (prospective clients) for Uglemetan are limited the primary indicator of replication success is the completion of the demonstration projects.

In the case of the project at SUEK, the demonstration cogeneration project has been followed up by additional units of 3MW capacity and SUEK is currently implementing plans for a large CMM cogeneration unit involving gas from 6 mines in Kuzbass. SUEK staff gave full credit during the interviews to the CMMRUC being the catalyst for developing their CMM projects.

The approach for replication was reasonable and although there were delays regarding the demonstration projects it is doubtful that any other approach would have gotten the interest of the coal-mine companies in Russia to invest in further projects since the concept needed to be proven. As one of the repositories of the knowledge and lessons learned gained from the demonstration projects, Uglemetan's continued existence after the project assures that this knowledge can be used for future CMM projects. Likewise, the knowledge gained by the coal-mine companies also increases the chances of future replication.

Other aspects to assess in the review of Project formulation approaches would be UNDP comparative advantage as Implementing Agency (IA) for this project; the consideration of linkages between projects and other interventions within the sector and the definition of clear and appropriate management arrangements at the design stage.

UNDP may not have been the only possible IA in Russia but UNDP Russia was well equipped to manage the process between the different stakeholders involved in the project. The two major management challenges that UNDP had to overcome was the geographic separation between UNDP Russia (in Moscow) and the CMMRUC (in Kemerovo), and the fact that UNDP did not have staff with CMM technical expertise in-house. The first issue created communication and oversight problems from time to time between UNDP and CMMRUC, however it should be noted that no other potential IA had an office in Kemerovo, either.

The second issue meant that there was little possibility in the early days of the project to question or challenge decisions that were made by CMMRUC management in regards to technical issues affecting project performance. However, as the project went along UNDP's internal capacity and understanding of the issues surrounding CMM improved. To UNDP management's credit, once it was clear that the project had serious problems (some related to the original design) in 2007 (after the midterm report) actions were taken to revise the project, make changes, and put the project on a more successful path (i.e. adaptive management).

4.2. Project Implementation

Evidence was provided that showed the periodic use (at least annually) by project participants of the "logical framework" (though this concept was called something different and formulated differently during the original formation of the project). Several workplans were established at different times during the project but after the mid-term review in 2007 several changes in the project strategy and goals were made in order to improve results. This was partially in response to the lack of an active JI market in Russia, and other barriers outside the project's control. So there is strong evidence of adaptive management during the project implementation.

² Uglemetan is the name of the service company that operates the CMMRUC. The relationship and organizational structure is explained in more detail on page 27.

In terms of IT, a project website is maintained by a dedicated person in CMMRUC, and both UNDP and CMMRUC have access to state-of-the-art communications/IT systems. The project has a website and one person who is responsible for maintaining and updating it. Currently there is some news for 2010 on the website, and other information on the different projects at http://www.uglemetan.ru.

According to information collected during the interviews, staff from UNDP and Uglemetan noted that communication between UNDP and Uglemetan (and the National Project Director and Uglemetan) could have been better at times, particularly during the early years of the project. This was due primarily to personality issues and not the underlying management structure or systems put in place. To summarize, the management of CMMRUC sometimes saw different priorities in regards to what constituted project progress and success. Such a situation can be expected if one considers that CMMRUC/Uglemetan is primarily a small engineering consultancy focused on project development with a different culture than a large bureaucracy like UNDP. CMMRUC management considered its top priority to be establishing the demonstration projects (which were continually delayed and required much work with regulatory agencies) and put more effort to this task than e.g. lobbying the Federal Government for improved degasification regulations favoring CMM, and/or external promotion of the project.

The evaluators can empathize with the situation during the first years of the project: If you have nothing concrete (i.e. a demonstration project) to show as a result then it is difficult to commit to promoting the success of the concept/project to other stakeholders. In the evaluators' opinion the project management underestimated (or perhaps never considered) how to deal with the obvious difference in organizational culture between UNDP and CMMRUC during the early years of the project. According to UNDP staff the priorities for project implementation between UNDP and CMMRUC were different. For example, according to the UNDP PM during the first 4-5 years CMMRUC called for patience until the boiler is in place, while UNDP/GEF was eager to see stable progress on each of the Logframe Indicators and appropriate reporting. Both MEDT and UNDP were unhappy with the lack of clear indications that the project would indeed deliver while the CMMRUC believed that the barriers which prevented delivery were underestimated.

On the other hand, one key management mistake was the decision by UNDP to not hire an international CMM expert during the beginning of the project as called for in the initial project plan. It is impossible to know whether or not the project would have had quicker results, and much would have depended on the individual selected to assist CMMRUC. According to UNDP Russia staff the early attempts to work with international consultants gave mixed results and it was considered to be an expensive use of financial resources versus very limited or no added value. The early parts of the project involved CMMRUC formation and capitalization, including countless issues related to CMM development under the existing domestic laws and regulations within Russia. It appeared that the International CMM Expert hired in 2007 provided only limited assistance with these issues. However, there is clear evidence and testimony from the interviews conducted in July 2010 that the project was improved by the addition of a new International CMM Expert in 2008. According to UNDP staff and reports the communication and reporting improved and the international expert was able provide ideas for expanding CMMRUC's services that have produced new business for CMMRUC.

Oleg Pluzhnikov mentioned in his interview that he was quite surprised by the attitude and resistance of the coal mining community early on in the project. However, Mr. Pluzhnikov now believes the attitude has changed dramatically and that the only reason SUEK applied for the first Russian JI Tender is because of the project. Similar opinions were echoed by SUEK staff during meetings.

It became apparent to the evaluators that all parties have been working more closely together since 2008. Some problems were outside the project managements' control, while some were internal problems that were eventually rectified by the project management. Sometimes it is not how one starts but rather how one finishes. By acknowledging the problems during project implementation and by taking steps to rectify these problems the Implementation Approach of the Project is rated as **Satisfactory**.

Monitoring and evaluation

As noted in the previous sections, the project activities were monitored and reported in accordance with the project plan (LogFrame, annual PIRs, etc.). However, due to various circumstances the creation of the CMMRUC and the completion of the demonstration projects were severely delayed. The mid-term evaluation report (2007) was a catalyst which enabled UNDP to make several critical changes to the project. Therefore strong evidence exists that the project management did its best to "turn-around" a project that had poor results by 2007. It should be noted that 3 annual project extensions were required, the final one to December 2010. Judging by the results in 2010 it appears that their actions eventually worked and the project results were greatly improved from the situation in 2007. Therefore the Monitoring and Oversight of the Project is rated as **Satisfactory**.

Stakeholder participation

As noted in the Project Formulation Section, above, the mines and mining companies were involved in the project early as stakeholders. After their initial show of support and assistance in the planning, their involvement became more tenuous when it came to selecting and siting the demonstration project. None of the coal mines were forthcoming. The Raspadskaya Mine was a typical example. They agreed to several meetings to discuss the possibilities, but they finally declined providing a site.

The Mid-Term Evaluation Report described this problem in more detail:

"Lack of initial commitment from Kuzbass mines to commit to project. This issue is derived in part from the lack of understanding of what is entailed in developing coal mine methane recovery and use projects, and what might be required of the host mines. Regardless of need, Kuzbass mining companies seem unwilling to commit funds to the project. This lack of understanding is due largely to the fact that while coal mine methane utilization is common in most other gassy coal basins in Europe as well as elsewhere in Russia, no projects currently exist in the Kuzbass and presently, there are no incentives to do so. As with most coal mine managers in the world, managers in the Kuzbass are focused in producing as much coal as possible for sale. Many managers perceive involvement in demonstration of technology that they do not understand as an unnecessary complication to their pursuit of production goals. It is clear that a mine (or mining company) <u>must</u> become a champion for this project. As a high profile stakeholder, a mine would benefit from the demonstration of the technology, share in the revenue stream, and the safety benefits."

As noted, it is not surprising that traditional coal companies would show initial interest but then shy away from new technologies with which they are not familiar. As successful as the MBS might be, the financial value to the coal mine was not significant as compared to their core business of mining coal. Fortunately, SUEK finally agreed to site the MBS at their Komsomolets Mine. With this participation, they became a critical stakeholder in the project for about five years. The MBS was then sited at their Mine. Unfortunately, the Company indicated an interest in selling the Komsomolets Mine and asked that the MBS equipment be removed so that potential buyers would not be deterred from the purchase because of this installation.

Even though SUEK backed out of hosting the MBS, they continued to be a key stakeholder as they used the services of the CMMRUC in support of their CMM development at their Kirova Mine. They also provided multi-million dollar co-funding for this project by installing the CMM-fired gas generators at the Kirova Mine. Mr. Victor Kosterenko, Chief Mining Engineer on Aerology SUEK, stated during his interview with the evaluators that the installations were in fact catalysed by the UNDP project and its early promotion and awareness building for CMM utilization.

It was fortunate the CMMRUC was able to convince SDS-Ugol to provide an alternative site for the MBS on short notice. The Company even agreed to spend a considerable amount of money to prepare the site and to modify their delivery system to provide the fuel to the site. During his interview, Dr. V. Efimov, Deputy Director of Science SDS-Ugol, had indicated that he had been very supportive from the outset when he heard of the opportunity for SDS-Ugol to be the host for the demonstration unit. He was the key individual at SDS-Ugol who convinced their management to pursue this opportunity. This has brought them into the fold as an active stakeholder. They even asked the CMMRUC to review the feasibility for installing a similar MBS at two additional mines of theirs.

Several international and national financing and CMM development organizations have shown considerable interest in working on CMM in concert with the CMMRUC and this project. Those include World Bank, Russian Carbon Fund, Demeta GmbH, Green Gas, Marubeni Corp., Mitsui & Co., Greengas and MGM International. The peak interest in this regard was probably around the time that the project organized the International Conference Coal Mine Methane: Recovery, Utilization, [and] Investment Opportunities in Kemerovo in 2006. Green Gas from the UK showed interest at that time and has continued to make periodic contact with the CMMRUC.

Involvement by the various Ministries of the Russian Federation has been based on their respective roles in the national government. The Ministry of Economic Development was assigned the key functions related to the Kyoto Protocol and greenhouse gas emissions reductions. The Ministry of Energy governs the extraction of methane as an energy resource. The Ministry of Natural Resources has been given the assignment of measuring and monitoring methane emissions but that Agency has not established any specifications or protocols for implementing that task so their involvement has been nominal as there has not been a contact person with whom to deal at that Agency. They have been sent project reporting material based on their capacity as the focal point for GEF involvement in the Russian Federation.

The Kemerovo Regional Administration has been very supportive of the project and helped support CMM development in Kuzbass in many ways. This was explained by Dmitry Islamov, Deputy Governor (Economics) of Kemerovo Oblast, during his interview. He mentioned that his group's involvement increased significantly since 2008 once Kuzbass coal mines began to consider CMM projects to be viable in Russia. They have certainly shown the most interest at the times when there have been accidents at the coal mines – especially if they were related to methane hazards. At those times they would motivate the mines to improve their attentiveness to safety. The Regional Government also tried to promote innovative uses of CMM from coal mines. They even passed tax incentives to try and support such applications, along with other innovative technologies.

The Kuzbass TechnoPark is an organization formed by the Regional Government that raises funding from the national government and private industry to form partnerships for technology innovation. They have been supportive of the CMMRUC activities in CMM development and would financially support developments that were commercially feasible.

It should be pointed out that up to now, there is no official coal industry association or CMM lobby group that jointly supports industry issues on behalf of the coal companies to the Russian government. Apparently there are ongoing discussions about forming such an association but nothing has been implemented yet. In many countries this would have been an early outcome of this project's activities, but in Russia it was not viewed as a priority by the project stakeholders.

Given the stakeholder involvement and their significant contributions to the general development of the project, (including larger-than-expected co-funding by SUEK and SDS-Ugol), and their continued commitment to CMM development as repeated throughout the interviews, this element of Stakeholder Participation is rated as **Highly Satisfactory**.

Financial Planning.

(i) The actual project cost by objectives, outputs, activities

The originally budgeted costs from 2000 and the actual costs by outcomes and activities (as of September 2010) are shown in two tables in Annex 6. The analysis of the project costs shows that most of the financial resources were allocated to project Outcomes 1 & 3 (almost \$2 mil USD out of the \$3.1 mil budget). Originally, Outcome 3 was to be fully funded by co funding sources, however, the \$1.5 mil pledged by NPAF never materialized. As a result, GEF funding of targeted equipment provisions reflected the transformation of the business idea around the CMMRUC in the course of the project implementation. The Outcome 3 co-funding (from coal mines) eventually exceed the

originally anticipated amount, but the GEF seed money for project implementation was necessary to attract co-funding.

The table also illustrates major resources were invested in Outcome 1 in capacity building of the CMMRUC staff, as well as training, business planning and marketing efforts. The final costs were much lower than budgeted (as funding needed to be shifted to Outcome 3). It appears that important capacity building actually occurred as part of the Outcome 3 project implementation. A considerably lower-than-expected portion of the budget was spent on the activities under Outcome 4, as most of the work associated with this outcome was accomplished by the CMMRUC or CMMRUC-associated experts as a part of the Outcome 1 & 3 activities. The actual cost for Outcome 2 was less than budgeted for and Outcome 5 was slightly over budget. Project management costs (Outcome 6) accounted for 16% of total project disbursements – which is considered quite reasonable given the project was extended for several years.

(ii) The cost-effectiveness of achievements

Evaluating this factor is not straightforward and not easily measured. One cannot simply focus on the immediate accomplishments of the project to make this assessment. The project has had a profound impact on the CMMRU development in Russia, both in the recent past as well as in what will happen in the future. These elements are described in great length in other parts of this Evaluation. It is appropriate to consider all of these impacts as benefits which were accrued from having made the project's financial investments. From a strictly environmental benefit measure (i.e. abatement cost of GHG reductions to date) the cost of the GHG reductions would be not seen as cost-effective compared to current market prices for CERs/ERUs (\$14-18 per ton). However, from a market building/transformation perspective the amount spent was minor compared to the long-term methane mitigation impacts on the coal mine sector in Russia. If the environmental benefits from the project are counted over a the life of implemented projects (typically 10 years), then the future GHG reductions attributable to the project will increase, and improve the actual cost-effectiveness of the GEF intervention

(iii) Financial management (including disbursement issues)

As for the project disbursement issues, the delivery rate for the first 3 years of implementation was well below the expected level. This was associated with numerous barriers accompanying early years of project implementation, and the project management strategy primary focusing on lifting the major of the barriers associated with an absence of methane utilization experience in Kuzbass, by means of demonstrating the viability of CMM utilization models. The demo project preparation took much longer than expected (mainly due to technical difficulties and various appraisals), thus hampering full-scale activities under other project outcomes. Only once the demonstration project was shaped up in 2007 the disbursement rate reached generally acceptable levels (60-90%). By now, four months before the project closure, some 3% of project total budget remain unspent but committed for remaining equipment purchases for CMMRUC, as well as general project wrap-up activities, development of the post-project sustainability strategy and dissemination of project results and lessons learnt.

(iv) Co-financing

The amount of cash co-financing expected under the Project Document was approximately US\$5,000,000 (\$5mil). Of this total, \$3.3 mil. was to have been provided by private sector sources (coal mines), \$2.2 MM from the Russian National Pollution Abatement Facility (NPAF) and \$0.35 mil. from foreign sources (U.S. Environmental Protection Agency). Even though the NPAF funding never materialized, the private sector more than covered the shortfall. SUEK has expended nearly \$4.4 mil. with their CMMRU work, including CMM project development at the Kirova Mine. Both evaluators agree that the UNDP demonstration project and the activities conducted by CMMRUC were key contributors in the decision by SUEK to implement a CMMRU program within their

Company, and specifically to install the power generating and boiler upgrade equipment at the Kirova Mine. Additionally, SDS-Ugol has spent approximately \$2 mil. toward their CMMRU development efforts, mostly in the form of direct support for the MBS demonstration project located at their Krasnogorskaya Mine.

Beginning in 2008, CMMRUC found an unexpected new source of funding from the CoMeth European Commissions Project for approximately \$0.25 mil. Demeta GmbH has also provided funding to CMMRUC for various CMM evaluations at SUEK mines as part of the government-funded CoMeth Project that amounts to \$0.1 MM of co-financing.

In the end, CMMRUC activities attracted nearly \$7 mil of capital co-financing which is significantly more than the originally planned \$5 mil. One can also add much more in-kind contributions from SUEK and SDS-Ugol that raise the total to over \$10 mil. This can be considered a notable achievement when compared to the GEF contribution of \$3.1 mil.

The sustainability of the project can be judged by three main topics:

- 1) The Project's lasting influence on the regulatory framework regarding CMM projects in Russia.
- 2) The future development (replication) of CMM utilization projects in Russia.
- 3) The establishment of Uglemetan and CMMRUC as long-term organizations with a economic future that is secure.

In regards to 1) it is clear from evidence and interviews that the project had a positive influence on the regulatory authorities (including RosTechNadzor, the National Agency in charge of coal mine safety) ability to assess and license CMM utilization projects. Unfortunately, due to recent and high profile explosions/accidents at two (2) coal-mines in the Kuzbass region there are new safety regulations regarding degasification being discussed at the Federal level. How this will impact the viability of future CMM projects is unknown. However, such developments are outside the project's control and based on the current outcomes it is likely that the regulatory progress that was made by the project will continue to promote/allow CMM projects at suitable mines.

Currently there are few CMM projects in Russia besides the demonstration projects. But as discussed elsewhere in this report, several more are planned, and with the recent positive developments in the Russian JI program (SUEK received a Letter of Approval in September, 2010 for the part of its CMM JI project that it had submitted earlier in the year). it is clear that there is positive momentum to support CMM projects in Russia in the future. To temper this optimism it was pointed out by SUEK's manager Viktor Kosterenko during his interview that currently SUEK hasn't made any profit on their CMM projects from ERU sales and the investments are primarily done today for learning and to provide a positive image for the company. Hopefully this situation will change as Russia's JI program proceeds to develop. Therefore even though the potential for CMM was overestimated during the formative period of the project, it is not an exaggeration to claim that the project was the primary driver for establishing the proof-of-concept for CMM projects in Russia and the mother of the planned CMM projects at SUEK and other companies.

The sustainability/permanence of the last topic is the most difficult to assess. Due to the unusual history of the development of the CMMRUC the project actually has supported the business development of two separate legal entities: Joint Stock Company "Uglemetan Service" (JSC) and Uglemetan Non-profit Organization (NPO). Uglemetan JSC is 100% owned by Oleg Tailakov and is a for profit venture that performs most of the consulting work contracts for Uglemetan clients. Uglemetan NPO is the official structure for the "CMMRUC" and is used to conclude contracts for work with e.g. UNDP, US EPA, and to utilize grant money for projects etc. While uncommon the combination of legal vehicles offers "Uglemetan" flexibility and a broader range of potential clients and income. Uglemetan is very reliant on the network and reputation of one individual, Mr Oleg

Tailakov. Should he no longer be leading CMMRUC or Uglemetan, their future would be less secure, unless proper steps are taken to develop a successor.

Another unusual aspect of Uglemetan/CMMRUC is its relationship with Institute for Coal and Coal Chemistry as the CMMRUC SUMMARY BUSINESS PLAN from 2010 states:

...CMMRUC is very fortunate in having flexibility in its personnel costs. The Company is able to keep valuable personnel available for work even when there are not revenues to cover the direct costs for their salaries. CMMRUC works closely with the Institute for Coal and Coal Chemistry. When there is no chargeable time for staff members for CMMRUC tasks, they are re-assigned to ICCC work. This keeps the staff available at slow periods but their salaries are not charged to CMMRUC...Given the flexibility that the Company has in its staffing expenses, it is able to match its expenses to available revenue. In that fashion the Company is by definition sustainable. It only has to cover nominal fixed costs and it can continue to operate and provide the necessary services to the coal mining industry in Kuzbass – and all of Russia.

While these statements may be true they do miss the point since the goal was to have a thriving, longterm business. According to data that can be made public (shown in Table 1) the companies revenues show a steady increase of income from non-UNDP sources, except for 2009 during the Economic Crisis. The period of large grants from UNDP in 2007-2010 correspond to investments for the CMMRU projects at the two coal-mines. During that same period Uglemetan (except for 2009) experienced strong growth in non-UNDP revenue. It does not appear that Uglemetan/CMMRUC are in any danger of closing, and new services have been positively received by coal companies. So it is very likely that Uglemetan will stay established for some years to come in one form or another. The founder of Uglemetan did not have the vision or goal to create a large company with offices in several cities or even countries, so it will most likely stay in its current form unless the strategy and goals of the organization change. But the question needs to be answered, "Is Uglemetan the right size to deliver CMM consulting solutions to the Russian market?". It is the evaluators' opinion that the answer is "yes", given the small number of potential clients in Russia.

Organization	Funding for the period 2003 – 2010							
	2003	2004	2005	2006	2007	2008	2009	2010
% UNDP	10%	13%	19%	35%	50%	58%	66%	29%
% Other	90%	87%	81%	65%	50%	42%	34%	71%

 Table 1: Uglemetan and CMMRUC funding from 2003-2010.

Execution and implementation modalities.

According to information received from UNDP staff, this project follows a typical approach used by UNDP/GEF projects. To quote some of the material provided to the evaluators:

The execution and implementation modalities of this project are typical for the UNDP/GEF Projects implemented in the recipient countries according to the UNDP National Execution Modality. At the beginning of the project's implementation the Project Document was signed between the UNDP and the Ministry of Energy of the RF representing the federal government. Mr. Oleg Pluzhnikov, the employee of the Ministry of Energy, was designated as the National Project Director for the project overall supervision and guidance. In 2004, reflecting some changes in functions and authorities of the Russian Ministries, the National Executing Agency for the Project was changed to the Ministry of Economic Development, while Mr.Pluzhnikov remained the National Project Director even though he was transferred to another Ministry. The Executing Agency's responsibilities include: (i) certifying expenditures under approved budgets and work plans; (ii) tracking and reporting on procurement and outputs; (iii) coordinating the financing from UNDP and GEF with that from other sources; (iv) preparation/approval of Terms of Reference for contractors and required tender documentation; and (v) chairing the Project Steering Committee (PSC).

The UNDP Country Office (CO) supports the project's implementation by maintaining the project budget and project expenditures, contracting project personnel, experts and subcontractors, carrying out procurement, and providing other assistance upon request of the National Executing Agency. The UNDP Country Office also monitors the project's implementation and achievement of the project outputs and ensures the proper use of UNDP/GEF funds. Financial transactions, reporting and auditing are carried out in compliance with the national regulations and UNDP rules and procedures for national execution.

Until mid-2007, the project was locally operated by the Project Management Unit (PMU) in Kemerovo. The PMU consisted of a Project Manager, administrative assistant, part-time IT specialist and an accountant. In addition, technical specialists were hired to facilitate implementation of technical Project components. The Project Manager was responsible for the operational management of the project.

In July 2007, the project management pattern slightly changed: the project management made a decision to consider "Uglemetan" as the service company for the Coal Mine Methane Recovery and Utilization Company (CMMRUC) to be established according to the Project Document. Oleg Tailakov, the UNDP/GEF CMM Project Manager was appointed a Director of the CMMRUC, and is now accountable for the operational management for the service company and the project as a whole. As a CMMRUC director, he hired staff responsible for financial management and reporting for the company and the project, daily accounting, technical implementation of CMMRUC activities, according to the staffing scheme approved by the National Project Director and UNDP. CMMRUC is now operating the project.

As it is stated in the most recent independent NEX project audits (2009 and 2010), such distribution of responsibilities within the Project appears reasonable and auditors consider the Project management structure to be appropriate. According to the latest Project NEX Audit report (2010), "the Project management structure and internal control system are effective for the Project successful implementation and comply with the UNDP rules and requirements".

The implementation arrangements for the project have been designed to maximize transparency and accountability. Project budget and workplans were made available, project progress have been regularly reported on to the key stakeholders and made available to the general public through the project web-page. Participatory decision-making is also highly stressed in the project. A Project Steering Committee (PSC) was formed to provide overall guidance and support for project implementation activities. The PSC met annually to review project progress and set major policy and implementation directions as required.

Interviews during the evaluation and the existence of a plethora of project reports support these statements from UNDP. In addition there were statements that indicate the choices for project manager and the eventual director of CMMRUC was extremely limited. The decision-makers agreed that Oleg Tailakov was the best, and practically the only, candidate for the role. Even when there was a call for major changes in the project in 2007 he was deemed by UNDP and the National Project Director as the best person available for the role. This seems reasonable as there was only a limited number of people with experience and knowledge of CMMRU in Russia at the time. The decision to hire an International CMM Expert was made to assist Mr. Tailakov with achieving more of the project objectives during the project extension periods, and it does appear that this, along with other actions (providing more training to CMMRUC staff, etc.), contributed to a smoother operation of the project after 2007. However, interviews with the UNDP RTA in Bratislava indicated that in his view a mistake was made in not hiring a business development advisor / financial speciality to work to provide CMMRUC with project financing options and capabilities and to enable it to grow beyond a consulting only model.

It should also be noted that UNDP Russia's involvement was characterized as "very open, flexible, and supportive of the project and the communications with the national authorities" by CMMRUC management, and that the informal contact between the two groups was very high (at least weekly).

4.3. Results

a) <u>Summary of Results</u>

The project had an objective to mitigate greenhouse gas emissions by removing barriers to the implementation and financing of coal mine methane (CMM) recovery and utilization projects in Russia. This was to be accomplished by strengthening the institutional and financial framework for CMM projects and by facilitating demonstration projects so as to allow for replication of similar projects. One of the key mechanisms for accomplishing this was to support the establishment of a "Coal Mine Methane Recovery and Utilization Company" (CMMRUC) which, after initial UNDP support, was expected to continue its operations as a self-sustaining entity.

The service company (CMMRUC) was officially formed in July 2007. Its core task was to finalise launch of the first demonstration project. That was the modular boiler system [MBS] installed at the Krasnogorskaya Mine. CMMRUC has achieved this core task of installing, operating and dedicating the MBS.

CMMRUC concurrently achieved numerous other milestones that had not been accomplished during the Company's formative stage, including the establishment of a marketing effort for its services with domestic coal mining companies.

Given the number and complexity of barriers associated with that effort one should appreciate the significance of CMMRUC's accomplishments. There were institutional barriers from lack of CMMRU project experience in Kuzbass, technical support barriers from a lack of technical expertise in the region addressing CMMRU skills, CMM regulatory and permitting barriers where CMMRUC had to meet unspecified regulatory expectations, and CMMRU financing barriers where neither coal companies nor third party financing had previously been made available for CMMRU projects in Kuzbass.

Due to the continuous efforts of the CMMRUC, one has been able to see a noticeable change of attitude of the coal companies towards CMM development. Initially there was little interest shown in developing CMMRU projects. But, that has changed to the current attitude of support for CMMRU activities. There has also been an increased awareness from the Kemerovo government towards such activities. The latter even passed tax incentives to promote CMMRU along with other novel technologies. Also, there were improvements put in place with regard to the regulatory framework with RosTechNadzor, the National Agency in charge of coal mine safety.

In addition to these efforts, CMMRUC has also been involved in another major CMMRU project being developed directly by a coal mining company in Kuzbass: SUEK. CMMRUC helped prepare the PDD for that Company's planned CMMRU development at six of their mines. The project plan was eventually accepted by Sberbank in 2010 as a JI project with the goal of attaining 1 MMtCO2e in emission reductions. The Company also helped SUEK with critical gas supply and electrical connections associated with the first implementation within that planned development.

It is notable that this Project has been in operation for nearly seven years. In that time the project management and UNDP staff members have demonstrated adaptive management in practice modifying the project Workplan activities to reflect changes in circumstance, and suggesting better indicators to track project progress. This adaptive management approach has periodically re-focused the resources of the Project in order to achieve benefits from the original investment.

The CMMRUC has been able to achieve these numerous positive results and has laid the foundation for CMM development in Russia. But, there were some technical and economic problems that provided exceptional challenges for the CMMRUC.

The primary technical hurdle has been the relatively small amount of usable CMM produced from Russian coal mines. Much of the total methane released from coal mines is in the ventilation air and the technology for using that methane was not available at the beginning of this project and is just now becoming viable. But, it also requires major financial subsidies even today. The only CMM that is currently likely to be usable is the drained gas that is piped to the surface from wells that have been drilled within the mine, underground. Much of that gas may not be usable, since the drainage systems are not always built and maintained using best management practice. The systems often have leaks that allow air to be pulled into the pipes that carry the CMM and which are operated under a vacuum. The mines are not concerned with air leaks since they do not affect the ability to move the gas out of the mine for safety – their primary reason for undertaking the drainage system in the first place. The leak only affects the methane concentration and if that is too low (<25%), then the CMM gas is difficult to utilize. A prime example of this is the low methane concentration at the MBS demonstration site, where it is difficult to operate the boiler for any extended period of time when the methane concentration drops too low.

The primary economic hurdle has been the lack of financial incentives for developing CMM projects. Unlike China, where much of the CMM development has benefited from an active carbon market (CDM), the Russian experience has been much more frustrating. Only in the last few months has there been any tangible movement towards a Joint Implementation (JI) Program that could provide needed financial subsidies for CMM projects. The developments under this project have been hampered by the lack of financial subsidy, where CDM incentives have helped develop the CMM market in China immensely. Even the USA, where there is no compliance-based carbon market, voluntary carbon markets and renewable energy credits have supplied millions of dollars of subsidy for CMM development.

Given the situation, it is notable that the CMMRUC has still been able to achieve significant accomplishments during the course of this project. The project has accomplished capacity building by developing the CMMRUC out of Uglemetan and provided modest but viable capitalisation for the CMMRUC. The Company has been involved in, and has funded or catalysed, every major demonstration of CMM recovery and utilization (CMMRU) that has occurred in Kuzbass in the last eight (8) years - the time period during which this project has been active. That includes

- (1) the Modular Boiler System demonstration at SDS-Ugol's Krasnogorskaya Mine funded by this UNDP/GEF Project,
- (2) the installation of 4 MW of CMM-fueled power generators at Kirova Mine and modification of a coal-fired boiler to utilize CMM (all financed by SUEK coal company) where CMMRUC was instrumental in project design and installation and in the preparation of the PDD, and
- (3) the anticipated development of CMM at Yuzhkuzbassugol's mines based on a solicitation for proposals by that Company.

SUEK and Yuzhkuzbassugol account for about 75% of the total CMM that is emitted from Kuzbass underground coal mines (IEA, 2009)³ and probably control 90% of the usable CMM in Kuzbass. So CMMRUC (hence the UNDP/GEF project) has been working actively with the coal companies that control virtually all the usable CMM in the Kuzbass.

³ This IEA reference did not include CMM emissions from SDS-Ugol's mines in their tabulation. That Company's emissions are lower than the other two that are noted but including SDS-Ugol's emissions would obviously bring the 3-company total to over 75%

Regardless of this success, the project has not been able to achieve the emission reduction target that was established in the original Project Document, as stated in the Project Objective and its associated Indicator in Table of MOVs. In 2010, the project can only account for having achieved about a 10% reduction of the annual target emissions. However, a very important note here is that the original target of 1 MM tCO₂e reduction per year could not be achieved unless SUEK were to complete all of the installations that they had planned in their 6-mine PDD.

Although it was reasonable to think that such development might have taken place when the PDD was being prepared, it did not materialize. Only one of the mines, Kirova, has had any CMM utilization equipment installed and it is unlikely that other installations will take place until there are major financial subsidies available for CMM projects. That is, until there is a functioning JI Program in Russia. Now it may be too late for this to even help since there are only two years left to receive financial support from the carbon credit sales under the JI Program. It would take much of that available time to just get new CMM projects to qualify as JI projects. However, there are discussions of extending JI to 2015 and/or including CMM projects into a Green Investment Scheme (GIS) that would also be managed by Sberbank to finance GHG emission reduction projects.

If one is to look at the level of achievement of key indicators as per the Project Logframe, it is notable that most of them are achieved, including

- Stakeholder agreement regarding the structure and formation of the CMMRUC,
- Use of focused training courses to build the CMMRUC staff capacities for developing and managing CMM projects,
- Completion of demonstration project design, equipment purchases, commissioning and operation,
- Review and recommendations for improvement of the legal and regulatory frameworks for CMM development,
- Helping establish tax incentives on a regional level for CMM development,
- Documentation of the results of the demo project implementation and project lessons learnt,
- GHG emissions reductions in demo project monitored, and
- Organizing workshops aimed at raising CMM awareness and publicising activity reports through mass media and CMM industry channels.

The primary indicator not achieved is the quantity of emission reductions, but, as mentioned above, it is also somewhat unattainable.

Based on this assessment, it becomes difficult to rate the attainment of Objectives for this project. The practical result is that the CMMRUC has been involved in all CMM development in Kuzbass, raised significantly its capacities and is sustainable providing services to the domestic coal companies and international CMM project developers. The demonstration project, (and CMMRUC in particular), have been leaders in a significant market transformation by reducing institutional barriers and facilitating major CMM developments in Kuzbass. Yet, the project has not achieved – and could not in the foreseeable future achieve - the Target Indicator Level set out for the project. Since Russia has not had a JI program (until July 2010) to provide meaningful financial incentives (estimated to be 2/3 of the revenues for CMMRU projects), it is somewhat surprising to have seen progress on any CMM development beyond the demonstration project. These currently operating and planned projects demonstrate the commitment of the coal mining industry in Russia to CMMRU project implementation, and confirm the statements in other parts of this review where the UNDP project is considered to be the primary driver for establishing the proof-of-concept and is the precursor for CMM projects in Russia.

The project did not achieve its emission reduction goals by 2010. However, in retrospect this goal was unrealistic and most likely unattainable except under the best market circumstances. As one reviews the real accomplishments listed above and considers the emission reduction goal in the context of

what was truly achievable then the Results rating is judged **Satisfactory**. Strictly speaking, by not achieving the emission reduction goal (although unattainable), the project may have received a lower rating but keeping in mind the overall results, one can support the aforementioned rating.

b) Detailed Results

In order to make a step-by-step review of all of the Project Outcomes and their corresponding Indicators, the Outcomes and Indicators from the 2010 APR/PIR were tabulated, as presented in Table of MOV's (see separate MS Excel file). These can be compared to the results from prior years as all of the PIR Outcomes are tabulated in Table of MOV's. Each Outcome is presented in a separate spreadsheet that shows the Outcome, Indicator, Target Level and each year's level as of June 30 of the respective year.

The spreadsheets presented separately show the changes that were made in some of the Outcomes, Indicators and Target Levels during the course of the project. As an example, the initial Development Objective (Goal in the Project Document) was "To create a viable market for and initiate otherwise the implementation of commercially feasible coal mine methane recovery and utilization projects in Russia." This was stated in the Full Size Project Document. One of the initial Quantitative Indicators (QI's) that was used to gauge progress towards meeting this Goal was "The investments into combined coal mine methane recovery and utilization projects exceed USD 5 million per year". It became evident that this was not a good measure of the environmental benefits to be gleaned from this Project, so this QI was modified in the Second logframe for the Project and stated in the 2007 PIR that the progress towards achieving the Development Goal will be "The annual GHG missions from venting coal mine methane into the atmosphere coming a) directly and b) indirectly from project activities amount to 5 [sic 1]⁴ MMtCO2e with an increasing trend".

i) Project Objective / Development Goal

The Quantitative Indicator 1 (see separate Table of MOV's) shows the primary reason why the Project was developed under unrealistic expectations by hoping to achieve 1 MMtCO₂e annual GHG emissions reductions and to have this total on an increasing trend. The latest version of the Business Plan, prepared for CMMRUC, included a market study of the potential for developing CMM projects at Russian coal mines. The market study in that Report concluded that "...utilizing 100% of the drained methane from all Kuzbass coal mines in 2003 that were not owned by SUEK would only provide carbon emission reductions of less than 500,000 metric tons per year of CO₂e. SUEK's mines would bring the total over 1 MM mtpy CO₂e..." However, 100% utilization is somewhat optimistic, since utilization of drained methane at U.S. coal mine is at closer to 80%.

ii) <u>Outcome 1</u>

Outcome 1 calls for the "Establishment and capitalisation of the Coal Mine Methane Recovery and Utilisation Company (CMMRUC) and ensuring its sustainable operation". This task took a significant amount of time in the early part of this project, as evidenced by the fact that the target level for Indicator 2 (the first one under this Outcome) was not achieved until 2007, when the Stakeholders finally agreed on the structure for the CMMRUC. There were a number of issues to resolve, from company structure and formation under Russian laws and regulations to the details of how to administer and operate the Company.

Originally, it was anticipated that the CMMRUC would be formed so that it could provide direct development of CMM projects for coal mining companies. This did not come to pass. As the CMM industry began to develop in Russia, as catalysed to a great degree by this project, it became evident that a CMMRUC would not be able to make the market penetration that was initially anticipated in this fashion.

⁴ The 5 MMmtCO₂e seems to be a typographical error that is a carryover of the USD5 MM note from the earlier QI. This is subsequently corrected in the Target Level description where reference is made only to 1 MMmtCO₂e.

At the very beginning, the project faced a problem of major stakeholder reluctance towards participating in establishing and capitalising the CMMRUC. Though some of the companies confirmed the necessity of a service provider, none of the stakeholders were interested in being co-funders for such a Company.

The largest coal mining Company in Kuzbass, SUEK, made the decision to develop their CMM projects internally. They were receptive to using the CMMRUC as an integral part of their development by using their experience in obtaining permits and even having them help with the installation and start-up of their CMM-fueled generators. But, they would not accept CMMRUC as the general developer of the project.

Although SDS-Ugol might have been receptive to the CMMRUC development approach, the CMM market potential with that Company was very limited.

Hence it was determined that the original concept for capitalizing the CMMRUC was misdirected and it should take more of a role of service provider than CMM developer. Being respected in the region and having staff with appropriate background, it was most reasonable to continue development of the service range for the Company and the staff capacities.

Uglemetan had unparalleled experience with CMM project development support. They were capable of working on everything from resource assessment (by performing coal gas desorption tests), to project planning and design, to financial analysis, to permitting, and finally operation. They are recognized internationally as the leading experts regarding CMM in Russia. In addition, the US EPA has periodically provided funding to this Company. They are frequently invited to international conferences to present overviews and analyses of CMM development in Russia.

The potential for CMM project development by the CMMRUC is not totally unachievable. Another major coal mining company, Yuzhkuzbassugol, had requested proposals from outside entities to help them with possible CMM development at two of their mines. The CMMRUC has formed a consortium of companies to respond to this request and one option offered under this proposal is to have the consortium finance and develop the project(s).

The development of a Business Plan, as measured by Indicator #4, also took several years. Even as it underwent revisions it was used as a working document and tool for managing the CMMRUC. The final version, as completed this year, provided a good definition of the real market potential for CMM development in Russia. Detailed CMM data had only recently come available regarding the CMM emissions from individual mines in Russia and the types of emissions from the mines. The data were published in a report from the International Energy Agency (IEA). The data showed that SUEK mines account for more than 60% of the CMM emissions in Kuzbass that might be currently usable in CMM projects. Given the situation with that Company's mines, as described above, there is further confirmation that the CMM market for project development is much more limited than for a service company that can support developments such as SUEK's and all other coal mining companies.

The CMMRUC continues to develop additional sources of funding. One of the prime objectives for this project was to establish the CMMRUC as a sustainable entity, as measured by Indicator #5. All of these efforts contribute to the likelihood of sustainability for the CMMRUC. It is notable that even during the current global economic slowdown that the CMMRUC is successful in acquiring new contracts for providing CMM analysis and development services.

The largest new contract for the CMMRUC is the CoMeth Project being funded by the European Commission (EC). When this project starts the next phase later in 2010 it will provide up to US\$150,000) to CMMRUC over a two year period. The Company also continues to seek additional work as evidenced by the proposals it has prepared that are described in Outcome 2, Indicator #6, below.

iii) Outcome 2 This Outcome calls for promoting demand for CMMRU projects and capacity building for the CMMRUC and local mine staffs so the projects can be completed successfully. The first Indicator under this Objective (Indicator #6) is that there would be at least six inquiries made to the CMMRUC from the regional mines regarding methane recovery and use. This Indicator has consistently been met each year. The latest year there were inquiries from two SUEK mines to indicate their interest in having seismic surveys run. This is a very promising result of the demonstration seismic survey that had been run at the Komsomolets Mine in November, 2009. This provides an immediate market for the seismic equipment that is currently moving through the UNDP procurement cycle. The Kirova Mine has also inquired about having the CMMRUC perform validation and verification work if the Russian JI Program accepts the SUEK proposal that was submitted to SberBank in March of this year. Another inquiry was from SDS-Ugol where their Krasnogorskaya Mine has signed a contract with the CMMRUC to provide training for their staff showing them how to operate the MBS.

Yuzhkuzbassugol sent out a request for proposals for CMM development at two of their mines in Kuzbass. The CMMRUC formed a consortium with several other companies to respond to these requests. The proposals were submitted early this year. Unfortunately, Yuzhkuzbassugol has been distracted from reviewing these proposals due to the recent accident at the Raspadskaya Mine. They are a major owner of that Mine and have had their management focused on that issue rather than worrying about CMM development at their other mines. The Raspadskaya Mine accident also drew attention to an earlier accident that had occurred at the Yubileynaya Mine (one of the Mines for which a development proposal had been sought.)

The Yuzhkuzbassugol proposals are not the only proposals that the CMMRUC has prepared to solicit additional work and to strengthen the likelihood of its continued sustainability. Other proposals have been prepared for the international Methane to Markets Program, where the CMMRUC is proposing to review the feasibility of utilizing the bleeder borehole methane (BBM) that is often produced from Kuzbass Mines. This is a CMM resource that is somewhat unique to the Kuzbass. It is found more frequently in this Region than at coal mines in other parts of the world.

Another proposal was prepared for submittal to Coal India. They had asked for proposals to assess the resources at coal mines in India. Although this is not directly related to CMM work in Russia, it could provide the CMMRUC with another source of revenue and would enhance the Company's recognition internationally.

The CMMRUC also worked with PEAR Carbon Offset, from Japan, in preparing a proposal for submittal to The New Energy and Industrial Technology Development Organization (NEDO) in Japan to study the CMM utilization potential in Russia.

All of these efforts contribute to the likelihood that the CMMRUC will exist in the future, but how the market for their services develops is difficult to predict. CMMRUC/Uglemetan currently employs one person responsible for full-time international business development (currently Tamara Panchisheva) who is now providing some success, and Oleg Tailakov provides successful local business development expertise and a track-record. As long as these key personnel are with CMMRUC/Uglemetan then the Company stands a good chance of repeat business with the coal companies and possibly expansion outside the Kuzbass region.

The other Indicators under this Outcome relate to the mines improving their CMM drainage methods and systems (Indicator #7) and providing training for the CMMRUC as a part of the capacity building function (Indicator #8). CMMRUC has documented nine training events over the course of the Project life; training up to eight staff members on topics such as government legislation, boiler maintenance, business management and financing. In addition, CMMRUC personnel attended four sites visits to CMMRU projects outside Russia, specifically in Ukraine (2005, 2007), Kazakhstan (2003), United Kingdom (2008).

The CMMRUC has always been attentive to the needs of the coal mining companies to making improvements in the CMM drainage practices in their mines. In 2007, CMMRUC worked with three drilling equipment companies operating in Russia, and developed costs estimates for vertical and directional drilling at Russian coal mines. This information was related to coal mine companies. It is obvious that such efforts can improve mine safety and possibly reduce the number and/or severity of accidents in the mines. More recently, CMMRUC used this combined drilling-methane utilization approach in its proposals to develop the CMMRU at two of Yuzhkuzbassugol's mines. As part of those proposals, CMMRUC would bring in an international drilling and drainage expert to review the existing drainage practices and to make recommendations as to how to improve them. The objective is not solely directed at improving mine safety. If the consultant can help improve the drainage system, it will likely lead to higher quality CMM being brought to the surface, which could correspondingly lead to easier implementation of CMM utilization technologies.

The capacity building among the CMMRUC staff has been continuous during the course of the project. Typically, CMMRUC hires engineers and scientist directly from an academic setting with competent design experience, but limited in real-world job experience. As a result, CMMRUC staff received on-the-job training regarding the installation and operation of industrial equipment.

One of the most important recent examples is the hands-on training that several of the CMMRUC staff members received during November, 2009. They were part of the field team who carried out the demonstration seismic survey at the Komsomolets Mine. This gave them immediate and valuable training in the practical aspects of running such a survey. Once the CMMRUC obtains the actual equipment to run such surveys themselves, the staff will be able to provide more valuable assistance in such surveys. As noted above, two of SUEK's mines have indicated an interest in having commercial seismic surveys run at their mines so this provides an immediate opportunity for revenue to CMMRUC and complements all the other outside contracts that are contributing to the CMMRUC's sustainability.

In addition to the seismic training, four of the CMMRUC staff went to the USA in October, 2009 to receive training in gas leak detection. Now that they are trained, this type of work can provide an important element to the CMMRUC bundle of services. Accidents can happen at CMMRU installations as a result of leaking pipes, connections and/or fittings. By providing leak detection as a service to SUEK, and other CMM developers, the CMMRUC can not only make such plants safer, but can also provide a potential revenue stream to the CMMRUC.

All of the Indicators under this Outcome are measurable on an annual basis and one need not wait for the end of the project to assess if they have met their target level. Given the consistency with which these Indicators have been met annually, one can consider these Target Levels to have been achieved for the entire project.

iv)

Outcome 3

The planning and implementation of the demonstration MBS at the Krasnogorskaya Mine owned by SDS-Ugol falls under this Outcome. Although this installation was originally planned for SUEK's Komsomolets Mine, it was eventually installed at the Krasnogorskaya Mine where it was commissioned and operated.

Most of the Indicators under this Outcome have been achieved. Indicator #12 was completed in 2008 as a modular boiler system (MBS) was chosen as the most feasible option for the CMMRU demonstration. The original scope of work was directed at power generation using CMM as the fuel. Since this took such a large amount of capital the Project Team ultimately chose the MBS option. The decision was also made to construct new, stand-alone units rather than to retrofit existing coal-fired boilers at the mines. Several reasons supported this decision, as follows:

- The installation work would interfere less with the ongoing mine operations,

- Retrofitting existing boiler houses would have to overcome expensive problems, including possibility of having to rebuild the boiler house building so it would comply with regulations related to having combustible gases inside a structure,
- Difficulty in quantifying savings, or understanding and documenting revenues to the mine.

There were some delays in pulling together the design team for this demonstration. The first company selected to accomplish the design work was UKRKOTLE Service from Donetsk, Ukraine. They had extensive experience with converting coal-fired boilers to gas firing. They were lower cost than Russian design companies. Initial indications were that the company would accomplish the work but eventually the business relationship simply fell apart with the company stopping its work and not honouring its contract. Some of the problem supposedly was caused by the involvement of the Ukrainian Government. It was told to CMMRUC staff that they would not allow any contracts with Russian partners, especially those where the transfer of technology was concerned. After strong efforts from the CMMRUC management the project money was eventually refunded by UKRKOTLE Service.

This led to the selection of a domestic company to perform the design work. Novosibirskteploenergoproect (NOTEP), from Novosibirsk, was subsequently chosen to design the MBS. The initial design for the MBS, for siting at the Komsomolets Mine, was completed in 2007. This achieved the Target Level for Indicator #9. But, the site-specific aspects of the design had to be revised when the unit was eventually sited at the Krasnogorskaya Mine. The project design documents were approved by the following authorities:

- Mine Safety Inspection,
- Ecological Control,
- Rospotrebnadzor (Consumer Safety Division), and
- Prombezopasnost (Industrial Safety Division).

In 2008, the Target Level for Indicator #10 was achieved as the MBS equipment, as manufactured by the Biysk Boiler Plant, was completed and delivered to the Krasnogorskaya Mine. It underwent shakedown operations and was successfully operated in a continuous mode so Prombezopasnost would allow commercial operation.

The technical feasibility of MBS operation (Indicator #11) was deemed successful with the operation of the MBS. However, the continuing shortage of CMM from the mine drainage system has limited the operation of the equipment and it currently is not operational. As a result, an economic feasibility assessment is not possible.

v)

Outcome 4

The Target Level for Indicator #13 called for a review of legal and regulatory issues related to CMMRU development. Any gaps that existed in support of such development were to be identified and recommendations were to be made for incentives that might assist CMM development financially. This was achieved during 2008 following the project-based approval of CMMRU development at the Krasnogorskaya mine by RosTechNadzor. By that time the CMMRUC had reviewed relevant legislation in the Kemerovo Region and a number of suggestions were presented to support methane extraction and utilization projects, such as tax breaks. The CMMRUC had also studied the permitting and regulatory issues which applied to the demonstration project being designed.

One should consider the Target Level Indicator #14 as having been achieved. Since this called for "Recommendations for improvement of existing legal and regulatory framework…" one could go on forever. But, given the accomplishments by the CMMRUC in this area it is apparent that the Target Level has been met. The CMMRUC has helped in the passage of tax incentives for CMM (and other innovative technologies) by the Regional Administration plus the accomplishments in overcoming

legal and regulatory hurdles for CMM development. The CMM incentives targeted were those outside the global carbon market framework.

CMMRUC has continued to break new ground in being able to obtain permits and to overcome the lack of defined legal and regulatory hurdles that face CMM projects in Kuzbass. The latest example was the successful permitting with RosTechNadzor of the smaller blower for the MBS. All of the experiences obtained since the beginning of the project can be applied to any future proposed CMM development project. CMMRUC has succeeded in registering their coal gas desorption methodology on a national level and SUEK is ready to use that procedure.

Outcome 5

Documenting and disseminating the results, experiences, and lessons learned fall under this outcome. The first indicator under this objective is Target Level Indicator #15 which relates to the reporting and disseminating the results of the demonstration project at the Krasnogorskaya mine. The project was not commissioned until June 2009, thus the reporting activities began in the 4th quarter of 2009.

The objectives of Target Level Indicator #15 were achieved through a variety of ways as described in Target Level Indicator #17.

CMMRUC issues a number of mass media press releases in Russia regarding the success of the project demonstration. News articles appeared in eleven publications such as *Siberia Express Magazine* and *RF Coal and Mining*. Following the release of information, CMMRUC received letters of congratulations and support from MEDT RF and Kemerovo Regional Administration. An article about the project was published in Siberia Express Magazine in early 2010. In addition, CMMRUC staff have participated in a series of Kemerovo-based radio interviews describing their CMM development activities in the Kuzbass region.

Target Level Indicator #17 was achieved through the following activities:

vi)

CMMRUC has drafted a manuscript "Coal Mine Methane Extraction and Utilization: "Problems and Development Prospects" that outlines a roadmap to navigate the difficulties encountered with CMM development including equipment permitting, regulatory approval, RosTechNadzor reviews, changing coal mine conditions, etc. To date, the draft has not been published.

Also available for stakeholders is a report: "Barriers to and Incentives for Coal Mine Methane (CMM) Development in Russia and Kuzbass and Lessons Learnt from UNDP/GEF Project - April 2010" which details barriers related to the following:

- Lack of Joint Implementation approvals
- Institutional Barriers
- Technical Barriers
- CMM Regulations
- Financing CMM projects
- Measurement, Monitoring, & Reporting

Furthermore, CMMRUC has summarized their experience gained by the UNDP project in a PowerPoint presentation which was delivered at the RF Coal and Mining Exhibition in Novokuznetz, Russia in June 2010. Additional presentations are slated for CMM-related venues in 2011.

In June 2010, CMMRUC updated the Uglemetan website to provide more updated information regarding the outcome of the UNDP project and the demonstration boiler. The website also has an improved layout and general content regarding CMMRUC services.

Target Level Indicator #16 was partially achieved. CMMRUC installed the proper metering and monitoring equipment to fulfil the object of verifying the methane emission reductions, however, because the project was operated for less than a week, the emission reduction results are of no significance to report. Until the project is restarted for a longer and more significant duration, the emission reduction results will not be included in technical reports.

The objectives of Target Level Indicator #15 and Target Level Indicator #17 could be met further in 2010 by disseminating the results of the projects to a larger, international CMM community including U.S. EPA's Coalbed Methane Outreach Program, UNECE, and Methane to Markets. Finally, discussions are being held regarding the value of conducting an end-of-the project seminar to disseminate and discuss the results of the UNDP project. Whether it should be a stand-alone event or part of a larger CMM workshop is also being considered.

Sustainability.

The evaluators' previously stated opinion about the sustainability of the CMMRUC is supported by data provided in the presentation by Dr. Tailakov presentation to them on July 20, 2010. He presented data related to projects that would be generating revenue for the CMMRUC this year. This indicated the potential for approximately US\$300,000 of revenue from those projects. Those projects did not include any additional work planned to perform seismic surveying which has already been assured in writing from SUEK. The presentation also indicated that a strong return would allow income to be allocated to general support of the CMMRUC, including efforts to market the company's services and generate more work. Based on this information the evaluators see that the CMMRUC continues to be effective in finding new revenue sources, aside from the UNDP Project, that support its sustainability. This is a particularly notable accomplishment given the current state of the international investment and the Russian economy. Total revenue for CMMRUC was approximately US\$500k in 2007, US\$1.2mil in 2008, US\$400k in 2009, and US\$600k in 2010.

Other benefits from this project include the sustainability of CMMRU development throughout Russia. As has been stated in other parts of this evaluation, this project has planted the seeds for CMMRU development at several coal mining companies. SUEK is already harvesting the results of these efforts. Both SUEK and SDS-Ugol confirmed their interest and willingness to continue such development, and they expect that the CMMRUC will be available to help them in the future since they had provided valuable support in the past. CMMRUC has demonstrated efforts to expand their services Russian coal basins outside the Kuzbass and into neighbouring, Russian-speaking, coal mine regions of Ukraine and Kazakhstan. Currently, there are five JI CMM projects listed in Ukraine and none in Kazakhstan.

Before this project, there were few if any people in Russia with skills related to CMM development. There was a need to develop all facets of the CMM industry - everything from technical to regulatory to business skills related to CMMRU projects. Through opportunities created from the development of the GEF/UNDP Project. his has been successfully accomplished as the CMMRUC can provide the full complement of such skills. More importantly, there are counterparts now within the coal mining companies and regulatory agencies that have been exposed to these projects and have, or are developing, comparable skills. Because the Project was publically funded and has not generated meaningful revenue, CMM project financial skills will need to be developed further on future commercial projects.

SUEK is a good example of a coal mining company that has now established a CMM staff within the Company, partly influenced by this project. They operate their facilities at the Kirova Mine and have their internal staff make evaluations of other CMMRU opportunities. Even this capability, they acknowledged during the final evaluation interviews that they will still look to the CMMRUC for support services for future projects.

The regulatory agencies, such as RosTechnadzor, have now become familiar with CMMRU development projects. By working with these agencies in implementing the Krasnogorskaya and Kirova Mine projects the CMMRUC has helped establish skills for these agencies as they relate to CMMRU projects, including their installation and operation. The importance of reducing the barriers to working with RosTechnadzor cannot be overstated.

5. Recommendations

• <u>Corrective actions for the design, implementation, monitoring and evaluation of the project</u> The project management has corrected the early implementation and monitoring problems from the project, which included resolution of the priorities and issues related to the UNDP and the CMMRUC interface. They have been able to work positively towards the common objectives. This has especially been the case since the International CMM Expert became part of the project team in October 2008.

No further corrective actions recommended.

• Actions to follow up or reinforce initial benefits from the project

Certainly the sustainability of the CMMRUC is key to any actions the evaluators can suggest as follow-up action. As they remain in business and continue to market their services, the coal mining companies and even international carbon funding sources, will be provided with periodic reminders that CMMRU development in Russia can be a viable undertaking, especially if the JI Program is continued.

No further corrective actions recommended.

Proposals for future directions underlining main objectives

The CMMRUC needs to maintain their marketing effort and continue to promote the development of CMMRU projects in Russia. They need to pursue opportunities for CMMRU project development along with the provision of various support services. Even though the coal mining companies, such as Yuzhkuzbassugol, show some inconsistency in their commitment to CMMRU projects, the CMMRUC should continue to work with those companies and try to motivate their involvement in such work.

Fortunately, SUEK, the largest coal mining company in Kuzbass has a more consistent approach to CMMRU projects since they have defined specific staff members who have the responsibility for operating and developing additional CMMRU projects. It is hopeful that the Russian JI Program is continued so that it would provide SUEK, and other coal mining companies, the incentive to implement more such projects. It is unfortunate that there does not seem to be any way in which the UNDP nor the CMMRUC can provide any significant input with regard to the JI Program, since it is such a key element in the future implementation of the project objectives.

No further corrective actions recommended.

6. Lessons learned

1. It is possible to turn around a project that is struggling but "adaptive management" and bold action is critical.

This project had a lack of demonstrable success in the early years, some of which was due to a project design that was not adaptable enough to changing circumstances. One of the weaknesses of GEF

project planning is that it is Soviet-like in preparing for the future project implementation and management: it overemphasizes adherence to procedures, a project document that is typically 2 years old by the time it is implemented, component outcomes/indicators and detailed component budgets, and long-term objectives which might be based on limited analysis or upon future market-needs that change faster than foreseen (or in this specific case, developments which were supposed to happen rapidly in Russia which did not). Accordingly, the project manager is not empowered enough to make significant changes rapidly even though he or she sees weaknesses in the original project design. This was such a situation that the project management found itself in with this project after the first few years.

The mid-term evaluation report in 2007 was the catalyst for change, but it was really described as the means by which management could get the authority to make the necessary changes in the project design which were obvious to some of the participants at an earlier stage in the process (e.g. no capitalization of CMMRUC to provide turn-key CMMRU solutions). It is outside the scope of this evaluation to recommend wholesale changes to UNDP/GEF project planning and implementation, but surely the system of "pre-planning" and initial adherence to this "master plan" contributed to the poor performance of this project shortly after its launch.

Conversely, management and the system did perform correctly when they changed some of the project objectives and developed a new "Project Logical Framework Matrix" in 2007. How bold such action really is in the UNDP/GEF context is difficult for these evaluators to really know, but it is a credit to the project decision-makers and management that they were able to push/promote these changes through and re-align the project goals, budget, and objectives to the operational realities in Russia and the coal-mining sector.

2. Sometimes persistence pays off.

Market building exercises dependent upon the timing of critical events can easily meet failure and/or delays. While it is simple to blame the Russian Government for failures to implement its JI program quickly enough, these evaluators have to point out that an somewhat analogous situation in the USA still exists today in regards to market players waiting for years for the US carbon market to arrive in earnest, and had planned many projects and activities only to see the market collapse when the US Congress recently failed to enact limits on greenhouse gas emissions and "Cap and Trade" legislation. In the period of 2005 to 2008 there was great interest in JI projects in Russia which led to some market activity and much assessment of JI projects in Russia. Unfortunately most of the projects stopped at the planning stage when project participants stopped further investment circa 2008. The financial crisis in 2008/2009 also contributed to the cancellation of many planned JI projects. Moreover, voluntary carbon credits that were able be generated in both countries have yet to provide the price signal necessary to spur CMM project development. The point is that building new markets is rarely a smooth exercise and timetables can be easily made irrelevant when government policy is a major contributor to success. This project was extended 3 times for 3 years due to a lack of early success but at the same time the project stayed within its original GEF budget during the entire lifetime.

For example in 2005, it was stated that most of mines simply refused to consider the possibility of hosting the first CMMRU demonstration project, mainly because of uncertainty with its possible costs, benefits, organizational solutions and long-term implications. It was only after active promotion of the demonstration project by the regional Administration did the Project receive the only proposal for hosting the demonstration project. As a result, it proved absolutely necessary to involve the Regional Government in this effort.

By 2007, communications with SUEK, the initial host of the demonstration project, had continued to improve. At that time SUEK was receptive to the fact that the Project Team had prepared a number of detailed reports analysing various CMM extraction and utilization options. The lesson here was that *continued communication* between the Project Team and the host coal mining company was

essential to a positive outcome. However, at this point, the Project encountered an unexpected and very unusual problem. After all the efforts to find a receptive host mine, the planned host mine (Komsomolets mine) for the boiler demonstration (where equipment had already been mobilized) was suddenly expected to be sold by SUEK. That required the CMMRUC to quickly find a new site for completing this critical first demonstration. Again, CMMRUC persisted. Had the CMMRUC not had the ability to accept this as another hurdle and to respond immediately to such a change, this Project would have failed.

In conjunction with the successful deployment of the Project in 2009, CMMRUC re-directed marketing effort to try and expand CMMRUC service offerings. At that time the continued efforts of the Project Team, including the international consultant, resulted in establishing significant momentum within CMMRUC to work in a more focused manner. This is evidenced by the marketing meetings that were held with the coal company management. Continuing direct contact with the coal mining companies has proved essential for marketing, as CMMRUC received unexpected work from SUEK during the presentations made to that Company.

In conclusion, during the last 2-3 years the project started to meet real success with coal companies, its demonstration projects, and finally with some support from progress in the development of the Russian JI/carbon market. So in this case it is safe to state that persistence eventually paid off for this project and its supporters.

3. Champions are required within the stakeholder institutions to engage with the project and promote its objectives internally.

In all cases, individuals who championed the cause made the difference in the organizations that participated in these projects. Therefore future projects need to identify these key allies within these stakeholders as soon as possible. This was certainly the strategy leveraged by CMMRUC and UNDP staff, and one of the reasons Mr. Tailakov was effective at promoting the project in the coal-mining companies and regional government. He was viewed as a legitimate actor despite his promotion of a novel/risky concept in Russia at the time. Mr. Tailakov put his efforts toward the people within the coal companies and government who could "champion" the cause and who were high enough in the organization to drive forward their involvement in the project. So using professional networks and engaging these is a skill that should not be underestimated for future projects.

The reviewers found that mining company officials like Victor Efimov of SBU-Ugol and Victor Kosterenko of SUEK were strong advocates of an emerging CMMRU industry in Russia. Although, the establishment of some kind of professional business association or industry lobby group/association was not one of the goals or outcomes of this project, it may prove timely following the completion of the demonstration project and the emergence of a JI program. In many countries this would have been viewed as a logical step to promoting the long-term success and goals of the companies and actors in the fields of mine safety and environmental technology. This issue was raised with one staff member from SUEK who mentioned that such an organization had been discussed by the separate coal-companies but currently such plans for an association were not decided.

4. Every country is unique! And Russia might be more unique than most.

Experience from other countries and regions are useful but not always applicable to the local situation. Even though CMM utilization best practices and successes from other countries were the starting point for this project, it is evident that such practices are always going to be secondary to the regulations and norms in Russia that stipulate how mines are degassed for safety reasons. Since the typical practices often produce CMM with a low methane content at the surface (<25%), it will in those cases limit the feasibility of CMMRU projects in Russia unless major investments are made in underground degasification systems. It is doubtful that this will change unless there is a significant economic advantage for the Russian coal companies, and consequently they are able to change their practices while still following the safety regulations imposed by Russian institutions. Such a situation

is the primary reason the first CMMRUC MBS demonstration project is not currently operating: the concentration of the methane in the degasification system is too low to be utilized safely (and vented to the atmosphere), and the coal mine has a limited ability to modify its degasification system due to the mine safety regulators.

Furthermore, in hindsight the CMMRU potential in Russia and consequent GHG reduction opportunities were overestimated from the beginning of this project and even during subsequent reviews when the goal of 1 million tons CO_2e annual reduction was decided. It is difficult for the evaluators to pinpoint a specific reason for this with any certainty. Some culprits might be the lack of public availability of high quality data on methane emissions (and the type) in Russian coalmines; and possibly an analysis which leaned too heavily on analogies from other countries and which perhaps needed more rigor (and/or funding) to produce an accurate picture of the potential from a technological and business perspective.

Undoubtedly Russian governmental bureaucracy hindered, and still hinders, the development of the CMMRUC market. From failures to implement JI in a timely manner to regulations that primarily focus on degasification (i.e. mine safety not methane utilization), the impact of multi-level bureaucracy was underestimated by the project designers.

Quite possibly, not only were the regulatory and bureaucratic barriers underestimated, but the goal of new market creation was overambitious given the unique nature and approach to business development in Russia. While market-building activities are still important to multi-lateral agencies like UNDP, one could hardly expect that an intervention of \$3 million over 7 years could quickly transform practices within an institutionalized, conservative coal industry with annual revenues of roughly \$15 billion. During the project lifetime the coal industry was consolidating (and cutting costs) and currently about only 10 groups control nearly 80% of the Russian coal market (which has the second largest coal reserves in the world). About 40% of all coal produced comes from underground mining (where methane emission occur), which is mostly controlled by just 4 coal mining companies. Furthermore, given that a carbon market did not provide a real financial incentive for the coal companies it is notable that the project was able to implement successfully the demonstration projects and subsequent spin-off projects at SUEK.

Therefore, a lesson learned may be that market building exercises/interventions need to better consider the risks and odds of changing behavior in conservative, highly regulated industries. On the other hand, if nothing is ventured nothing is gained or learned. GEF funding is supposed to be used for (risky) innovations, and CMMRU projects in Russia were certainly novel and innovative. History is littered with great innovations that failed to be adopted, so to be active in the "innovation business" means one must expect less than a 100% success rate to begin with. So, while this project was not an unmitigated success on all fronts, neither was it a failure.

5. Having UNDP staff with knowledge of the industry is critical

The evaluators suspect that UNDP and GEF, being environmentally focused organizations, had few, if any, staff onboard that really understood the Russian coal industry and what would really drive decision-making in that industry. So it took some time before realistic goals for the project, and a message to the industry could be formulated that really resonated; and at the end of the day, external events such as mine accidents, or the need to show progress on the environment to the government, might have been just as critical in getting the coal mining company management(s) to finally take the project's message seriously. Therefore, one lesson may be to recruit project personnel with industry experience into the implementing agency when executing industrial focused projects, if possible, so that the different institutional cultures (and professional languages) can be quickly bridged. In addition, finding the right international advisor/expert for the project is a challenge but it is necessary to bring a good one onboard that can bring industrial best practices from other regions of the world to the project.

Annex 1. Final Evaluation ToR's

Submitted separately.

Annex 2. Table of Project Outcomes and Targets before and after 2007

Item	Project Objective and Outcomes	Objectively Verifiable Indicators & Indicator Target Values	Indicator Target
Development Goal - OldObjective (per FSPD) and Development Goal: To create a viable market for and initiate otherwise the implementation of methane recovery and utilization projects in Russia.1. The annual G 		1. The annual GHG emissions from venting coal mine methane into the atmosphere coming a) directly and b) indirectly from project activities amount to 1 MMtCO2e with an increasing trend.	1. 2005: The investments into combined coal mine methane recovery and utilization projects exceed USD 3 million per year (including those generated from JI mechanisms); 2006: The investments into combined coal mine methane recovery and utilization projects exceed USD 5 million per year (including those generated from JI mechanisms)
			2. 2005-2006: The annual GHG emissions from venting coal mine methane into the atmosphere reduced by at least 5 % from the baseline case
Development Goal - New 2007-2010 PIR's	Development Goal: Reducing the amount of methane vented into the atmosphere from coal mines	1. The annual GHG emissions from venting coal mine methane into the atmosphere coming a) directly and b) indirectly from project activities amount to 1 MMtCO2e with an increasing trend.	1. 2007-2009: The annual GHG emissions from venting coal mine methane into the atmosphere coming a)directly and b)indirectly from project activities amount to 1 MMtCO2e with an increasing trend
			2. N/A Removed
Outcome 1 - Old 2005- 2006 PIR's	Establishment and capitalisation of the Coal Mine Methane Recovery and Utilisation Company (CMMRUC) and ensuring its sustainable operation	1. The company operates in a financially sound manner, and has managed to leverage additional financial resources for continuing and expanding its operations by the end of the project	1. The company established and capitalized at the amount of at least USD 3 million
			2. The company operates in a financially sound manner and has managed to leverage additional financial resources for continuing and expanding its operations by the end of the 3rd year of its operations.
Outcome 1 - New 2007- 2010 PIR's	Establishment and capitalisation of the Coal Mine Methane Recovery and Utilisation Company (CMMRUC) and ensuring its sustainable operation	1. The company operates in a financially sound manner, and has managed to leverage additional financial resources for continuing and expanding its operations by the end of the project	1. N/A Removed
	operation		2. The company operates in a financially sound manner and has managed to leverage additional financial resources for continuing and expanding its operations by the end of the project.
		2. Stakeholders identified and agreed on the legal & organisational arrangements for CMMRUC establishment with provisions for further capitalization of the company to insure its	3. Stakeholders agree on the legal & organizational arrangements for CMMRUC establishment
		sustainable development. 3. The company formally registered and staffed according to the agreed institutional setup	4. The company is formally registered and staffed according to the agreed institutional setup.

Item	Project Objective and Outcomes	Objectively Verifiable Indicators & Indicator Target Values	Indicator Target
		4. Business plan for the CMMRUC developed and accepted by stakeholders	5. Business plan for CMMRUC developed and accepted by stakeholders.
Outcome 2 - Old 2005- 2006 PIR's	Promoting demand for methane recovery & utilisation projects and building capacity of local personnel of the CMMRUC and the participating mines to develop, market, finance, manage and implement the projects.	1. At least six inquiries received quarterly from the mines regarding methane recovery and use	1. 17 requests for CMMRU projects
			 2. 15 workshops are held at Kusbass mines in order to explain the benefits of implementing methane recovery and utilization projects using Kyoto mechanisms; a number of contracts are signed with companies for implementation of Kyoto mechanisms 3. Targeted personnel from up to 17 coalmines are visually trained for beneficial use of CMMRU project, not only for heat power production (boilers), but also for electric power production meeting local demands; KuzbassEnergo is approached for establishing a mechanism of using methane as alternative energy source for local power supply systems
Outcome 2 - New 2007- 2010 PIR's	Promoting demand for methane recovery & utilisation projects and building capacity of local personnel of the CMMRUC and the participating mines to develop, market, finance, manage and implement the projects.	1. At least six inquiries received quarterly from the mines regarding methane recovery and use	1. At least 6 inquiries received from mines regarding methane recovery and use.

2. N/A Removed

3. N/A Removed

2. Mines initiate changes to their existing drainage systems resulting in better mining safety conditions, increased productivity of their degasification systems and growing interest to methane utilization. 4. Mines initiate changes to their existing drainage resulting in better mining safety conditions, increased productivity of their degasification systems and growing interest to methane utilization. Mines initiate methane utilization without changing drainage practices.

Item	Project Objective and Outcomes	Objectively Verifiable Indicators & Indicator Target Values	Indicator Target		
		3. Focused training courses for CMMRUC personnel organised in order to enhance capacity of CMMRUC staff to successfully run the business and to develop, market, finance, manage and implement CMMRU projects on their own (reducing need for international expert support).	5. Focused training courses for CMMRUC personnel organised in order to enhance capacity of CMMRUC staff to successfully run the business and to develop, market, finance, manage and implement CMMRU projects on their own (reducing need for international expert support).		
Outcome 3 - Old 2005- 2006 PIR's	To demonstrate feasibility of and gain experience for implementation of CMMRU projects.	Not used	 The CMMRU projects implemented at least 4 boilers and 1 electric power generation facility 4 legally binding agreements signed 		
			3.The equipment have been procured, installed and commissioned. Projects starting to produce net revenues for both the mines and the CMMRUC		
Outcome 3 - New 2007-	To demonstrate feasibility of and ga CMMRU projects.	ain experience for implementation of	1. N/A Removed		
2010 PIR's			2. N/A Removed		
			3. N/A Removed		
		1. The most feasible option(s) for the CMMRU demonstration selected	1. The most feasible option(s) for the CMMRU demonstration selected		
		2. Demo project design completed	2. Demo project design completed		
		3. Equipment purchased and installed, project(s) launched on the ground	3. Equipment purchased and installed, project(s) launched on the ground.		
		4. Demo project monitoring proved technical and economic feasibility of coal mine methane emission reductions combined with heat production.	4. Demo project monitoring proved technical and economic feasibility of coal mine methane emission reductions combined with heat production.		
Outcome 4 - Old 2005- 2006 PIR's	Strengthening legal and regulatory framework to provide support for methane recovery	Not used	1. Revisions in the legal and regulatory framework supporting the coal mine methane recovery and utilization adopted.		
	and utilization projects.		2. A review report of the effectiveness of the existing legal and regulatory framework in supporting CMMRU projects finalized.		
			3. Recommendations for the improvement of the existing legal and regulatory framework finalized and submitted for formal Government approval process.		
Outcome 4 - New 2007-	Strengthening legal and regulatory methane recovery and utilization pr	framework to provide support for ojects.	1. N/A Removed		
2010 PIR's		1. A review of effectiveness of existing legal and regulatory framework in supporting CMMRU projects performed, gaps identified.	2. A review of effectiveness of existing legal and regulatory framework in supporting CMMRU projects performed, gaps identified.		

Item Project Objective and Objectively Veri Outcomes & Indicator Tar		Indicator Target
	2. Recommendations for improvement of the existing legal and regulatory framework submitted for formal Government approval process.	3. Recommendations for improvement of existing legal and regulatory framework submitted for formal approval by the Government.
To demonstrate feasibility of and gain experience for implementation of CMMRU projects.	1. Results of demo project implementation and project lessons learnt documented.	1. Report produced and disseminated
	2. A system to monitor the GHG reductions in place. Project technical reports made available for general public.	2. A system to monitoring and verification is being implemented by CMMRUC
	3. Awareness-rising workshops organised, other result dissemination activities (like publication of relevant materials in mass media, sending information about the project directly to coal mines) performed.	3. The project results disseminated through public media; Results disseminated and 5 seminars and workshops organized
		4. The project results disseminated through public media; Results disseminated and seminars and workshops organized
To demonstrate feasibility of and gain experience for implementation of CMMRU projects.	1. Results of demo project implementation and project lessons learnt documented.	1. Results of demo project implementation and project lessons learnt documented.
	Project Objective and Outcomes	Project Objective and OutcomesObjectively Verifiable Indicators & Indicator Target Values2. Recommendations for improvement of the existing legal and regulatory framework submitted for formal Government approval process.To demonstrate feasibility of and gain experience for implementation of CMMRU projects.1. Results of demo project implementation and project lessons learnt documented.2. A system to monitor the GHG reductions in place. Project technical reports made available for general public.3. Awareness-rising workshops organised, other result dissemination activities (like publication of relevant materials in mass media, sending information about the project directly to coal mines) performed.To demonstrate feasibility of and gain experience for implementation of CMMRU projects.1. Results of demo project implementation and project lessons

2. A system to monitor the GHG
reductions in place. Project2. GHG emissions reduction in pilot demo
project monitored. Project technical
reports are made publicly available.2. GHG emissions reduction in pilot demo
project monitored. Project technical
reports are made publicly available.

3. Awareness-rising workshops organised, other result dissemination activities (like publication of relevant materials in mass media, sending information about the project directly to coal mines) performed.

3. N/A Removed

Project Objective and Outcomes

Item

Objectively Verifiable Indicators & Indicator Target Values

Indicator Target

4. Workshops aimed at raising awareness organized. Other result reporting activities through newspapers, magazines; newsletters to coal companies; direct electronic news and information dissemination to journalists and press services of coal companies and administration of Kemerovo region, radio and TV.

Annex 3.	Itinerary
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Date	Location	Event			
15 July 2010	Moscow	Michael Cote meet with Victor Efimov, Deputy Director of			
		Science of SBU Coal, SDS-Ugol			
16 July 2010	Moscow	Both evaluators met with Irina Bredneva and Natalia			
		Olofinskaya of UNDP Russia			
17 July 2010	Moscow	Both evaluators met with Oleg Pluzhnikov, head of the			
		Project Steering Committee and Deputy Director of			
		Department in the Russian Ministry of Economic			
		Development			
17 July 2010	Kemerovo	Both evaluators met with Dmitry Islamov, Deputy			
		Governor of Kemerovo Oblast			
19 July 2010	Kirova Mine	Both evaluators met SUEK mining engineers and CMMRU			
		project operators			
19 July 2010	Krasnogorskaya Mine	Both evaluators met with mine engineers and Project			
		engineers from the Krasnogorskaya Mine			
20 July 2010	Kemerovo	Both evaluators interviewed Oleg Tailakov and several			
		CMMRUC staff members			
21 July 2010	Moscow	Both evaluators met with UNDP staff including John			
		O'Brien via teleconference			
22 July 2010	Moscow	Both evaluators met Peet Soot, international CMM expert			
		assigned to Project			
27 July 2010	Moscow	Jesse Uzzell met with Victor Kosterenko, chief mining			
		engineer at SUEK			
27 July 2010	Moscow	Jesse Uzzell met with Oleg Pluzhnikov again			

Annex 4. List of Persons Interviewed

Irina Bredneva, Project Responsible Officer, UNDP

Natalia Olofinskaya, Head of Environment Unit, UNDP

John O'Brien, Regional Technical Advisor, UNDP

Peet Soot, Technical Consultant, UNDP

Oleg Pluzhnikov, Ministry of Economic Development

Dmitry Islamov, Deputy Governor of Kemerovo Oblast

Victor Efimov, Deputy Director of Science, SBU-Coal, SDS-Ugol – interviewed by M. Cote w/IC in attendance

Andrei Pichurin - Head of Ventilation and Degas at Krasnogorskaya Mine

Sergei Mitichkin – Deputy Chief Mechanic Prokopevskugol (Mgr. - MBS)

Andrei Kostin – Deputy Technical Director, Prokopevskugol (formerly Chief Engineer Krasnogorskaya Mine)

Dimitri Sidorenko - Chief Engineer, Krasnogorskaya Mine

Michael Tumaykin, Deputy Chief Engineer of the Department of Degasification and Utilization SUEK-Kuzbass (Kemerovo)

Victor Gurov, Chief Mechanic of the Department of Degasification and Utilization SUEK-Kuzbass (Kemerovo)

Pavel Kostrukov, Power Engineering Specialist of the Department of Degasification and Utilization SUEK-Kuzbass (Kemerovo)

Oleg Tailakov, Director, CMMRUC

Denis Zastrelov, Economist, CMMRUC

Alexei Kormin, Procurement Specialist, CMMRUC

Alexei Smyslov, Leading Engineer, CMMRUC

Victor Kosterenko, Chief Mining Engineer on Aerology SUEK (Moscow) – interviewed by J. Uzzell only

Annex 5. Summary of Field Visits and Site Visit Photos

Summaries of the Project fields visit and interviews are embedded through this report. The itinerary is shown in Annex 2 and the list of persons interviewed is shown in Annex 3.



Figure 1: Demonstration Project at the Krasnogorskaya mine



Figure 2: Methane Monitoring Equipment Inside the Boiler Room at the Krasnogorskaya mine.



Figure 3: 1 MW CMM Power Station at SUEK's Kirova Mine



Figure 4: Methane Monitoring Equipment Inside the 1 MW Power Station



Figure 5: 3 MW CMM Power Station at SUEK's Kirova Mine

Annex 6. List of Documents Reviewed by the Evaluators

- I. Full Size Project Document incl. Annexes
- II. APR/PIR 2005 (July 2005)
- III. APR/PIR 2006 (July 2006)
- IV. APR/PIR 2007
- V. APR/PIR 2008
- VI. APR/PIR 2009
- VII. Draft APR/PIR 2010
- VIII. BUSINESS PLAN SUMMARY, Coal Mine Methane Recovery & Utilization Company
- IX. Project Mid-Term Evaluation Report For UNDP/GEF Project prepared by Mr..J.S. Marshall, finalized on February 15, 2007.
- X. International Consultant's Reports
 - A. Strategic Review of Project P M Soot / R S Kripowicz 17 March 2009
 - B. Strategic Review of Project 1st Contract Amendment 30 June 2009
 - C. Final Report for Work Performed from 1 Jan 15 July 2009 28 July 2009
 - D. Final Report for Work Performed from 16 July 31 Dec 2009
 - E. Final Report for Work Performed from 1 January 31 May 2010
- XI. Barrier Analysis & Lessons Learnt Report (Final Report, or Draft if Final is not available)

Annex 7. Project Costs

Table 1	1 -	Original	Project	Budget	from	2000:
	-	Build				

ACTIVITIES AND TASKS	GEF	Co-funding	Breakdown of Individual Co-financiers			nanciers
			NPAF	ME	Mines	US-EPA
Component 1: ESTABLISHMENT AND	1,479	1670		70	1600	
Output 1.1: The company established	1,479	1600			1600	
and capitalized and the staff hired						
Output 1.2: Ensuring the sustainable operation of the company during and after the	-	70		70		
Component 2: PUBLIC AWARENESS RAISING AND TRAINING	739	275		50		225
Output 2.1. Enhanced awareness of the key	329	250		25		225
stakeholders on the possibilities for and benefits of improved degasification, methane	027	200				
recovery and utilization						
Output 2.2: Trained personnel of the of the	410	25		25		
CMMRUC and the participating mines to						
develop and implement CMM projects		2 2 2 2 0	1 500	20	1 700	
DEMONSTRATION PROJECTS	-	3,230	1,500	30	1,700	
Output 3.1 Legally binding contracts signed	-	3,200	1,500		1,700	
between the CMMRUC and the participating						
mines for the implementation of the first						
demonstration projects.						
Output 3.2 Projects commissioned and they	-			30		
operate on a recovery basis						
Component 4: REVIEWING LEGAL AND	130	20		20		
REGULATORY FRAMEWORK	100	-0		-0		
Output 4.1 A review report of the	68					
effectiveness of the existing legal and						
regulatory framework in supporting CMMRU						
projects						
Output 4.2 Recommendations for the	62	20		20		
improvement of the existing legal and	02	20		20		
regulatory framework						
Component 5: MONITORING EVALUATING	348	30		30		
AND DISSEMINATING THE PROJECT RESULTS AND LESSONS LEARNT	510	50		50		
Output 5.1 A system in place to monitor and	124			30		
verify the GHG reductions achieved				20		
Output 5.2 Project intermediate and final	115					
evaluation reports	115					
Output 5.3 Dissemination of the project	109					
results through public media and, as						
applicable, by organizing additional seminars						
and workshops						
PROJECT MANAGEMENT	404					
Project management team	175					
Fauinment communication operations	127	+				
Treesel	72					
Iravei	12					
Audit and reporting	30					
Total:	3,100		1,500	200		225

Activities	Expenditure categories	Expenditures, USD
Outcome 1: Establishment and capitalisation of the Coal Mine Methane Recovery and Utilisation Company (CMMRUC) and ensuring its sustainable operation		
Feasibility assessments and initial business planning prior to CMMRUC establishment, development of a business model and a legal form for CMMRUC	National Experts	25 240
Initial business plan development for CMMRUC	CMMRUC staff costs	2 501
Legal support for CMMRUC	National Consultant-Lawyer	39 801
CMMRUC Personnel costs	Personnel	257 126
Comprehensive business plan development for CMMRUC	Subcontract	14 617
International expertise on CMMRUC business- planning, marketing of CMMRUC services &strategic development of the company	International Experts	119 417
CMMRUC Travel for business development	Travel	37 768
Travel other	Travel	43 017
Feasibility analysis for seismic equipment	Subcontract	41 742
Geophysical Equipment testing	Subcontract	29 584
Geophysical Equipment&Software purchase	Equipment and Software	49 984
Seismic Expert (Intl)	International Expert	28 050
CMMRUC equipment for desorption tests and gas content assessment, training in geophysical equipment application	Equipment, training	70 000
CMMRUC Office Equipment	Office Equipment	75 520
CMMRUC Office Supplies	Office Supplies	4 702
UNDP service charges	Service charges	4 369
Subtotal Outcome 1		843 437

Table 2 - Actual Project Expenditures October 2003 - September 2010 &Commitments till December 2010

Outcome 2: Promoting the demand for methane recovery and utilisation projects and building capacity of local personnel of the CMMRUC and the participating mines to develop, market, finance, manage and implement the projects

Project Coordination&Outreach Specialist	Personnel	96 788
Translation	Translation	1 385
CMMRUC Travel for capacity building, study tours for CMMRUC personnel and stakeholder		
mines	Travel	35 683
Travel other	Travel	19 334
CMMRUC Website improvement	Subcontract	1 464
Participation in CMM-related exhibitions	Mtng participation/info placement	6 399
Promotion the demand in demo project replication (boiler promo activities)	Subcontract	10 405

Software purchase for CMM content assessment, CMM project design	Software	12 360
CMMRUC general (business) personnel training: financial management, procurement, PR technologies	Subcontract	3 154
Training&software purchase for CMMRUC business planning	Subcontract	27 324
CMM technical personnel training in CMM project design	Subcontract	4 346
UNDP service charges	Service charges	2 789
Subtotal Outcome 2		221 431

Outcome 3: To demonstrate the feasibility of and gain experience resulting from the implementation of CMMRU projects

CMMRUC Personnel costs associated with demo project preparation, launch, monitoring	Personnel	324 738
CMMRUC Travel costs associated with demo project preparation, launch, monitoring	Travel	143 149
Travel other	Travel	14 819
1st demo project - boiler design and manufacturing	Subcontract	320 126
1st demo project - Associated design and construction (lightening protection, basement construction, pipeline design and installation)	Subcontract	142 004
1st demo project - associated equipment (e.g. piump)	Equipment	6 874
CMMRUC promotional materials	Subcontract	5 474
UNDP service charges	Service charges	1 134
Subtotal Outcome 3		958 317

Outcome 4: Strengthening the legal and regulatory framework for making it more supportive for methane recovery and utilization

National expertise - CMMRUC-based	Personnel	18 020
National expertise - methodology issues (outside CMMRUC)	Experts	14 000
Subtotal Outcome 4	r	32 020

Outcome 5: Documenting and disseminating the results, experiences and lessons learned

CMMRUC personnel costs associated with result dessimination	Personnel	47 904
Project specislist/experts on experience capturing, coordination, stakeholder outreach, results dissemination, lessons learnt capturing	National Experts	126 400
Intl expertise on results documentation and dessimination, esperience chapturing and sharing, lessons learned documentation	International experts	162 347
Project evaluation - consultancy&associated travel costs	International experts&travel	89 213
Project Webpage support costs	Personnel	13 707
Travel costs associated with result dessimination and experience gaining/sharing	Travel costs	50 587

CMMRUC PR media campain	Subcontract	37 262
Communication	Connectivity charges	4 472
Publications	Printing costs	10 911
UNDP service charges	Service charges	3 312
Subtotal Outcome 1		546 114

Outcome 6: Project management

Project Manager	Personnel	115 515
Project Financial Specialist - CMMRUC-based	Personnel	30 134
Project Assistant	Personnel	179 760
PM costs associated with project closure	Personnel	13 000
Travel costs	Travel	1 993
Project audit costs	Audit costs	31 764
Office equipment	Office equipment	16 110
Communication	Connectivity charges	24 685
Office supplies	Office supplies	38 751
Office rent	Office rent	25 018
Bank charges & sundry	Miscellaneous	11 535
UNDP service charges	Service charges	14 999
Subtotal Outcome 6		503 265
TOTAL		3 104 583

Annex 8. Comments by stakeholders (only in case of discrepancies with evaluation findings and conclusions)

Since no conflicting comments were received from stakeholders, this Annex is not applicable.